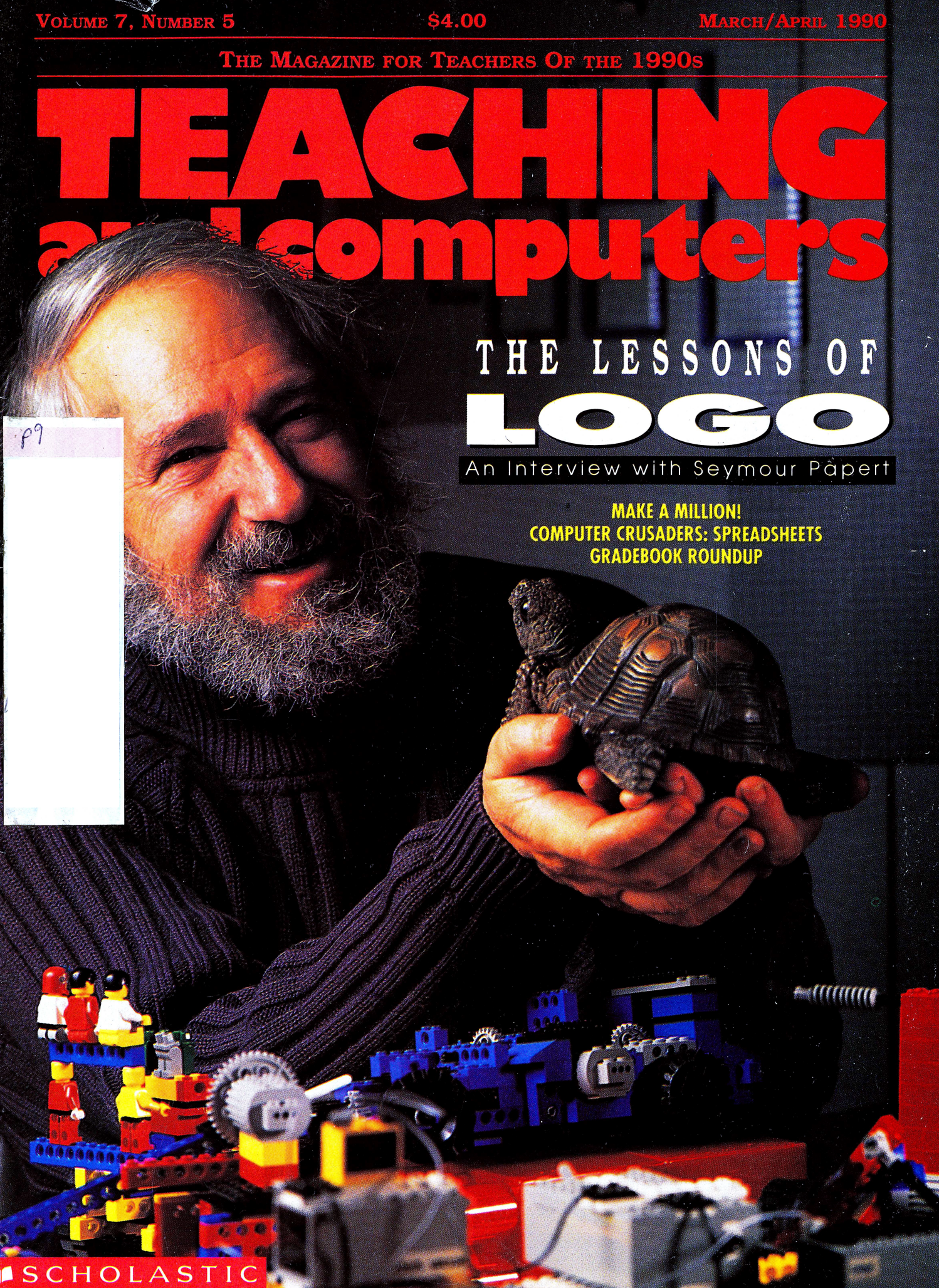
VOLUME 7, NUMBER 5 $4.00 MARCH/APRIL 1990

THE MAGAZINE FOR TEACHERS OF THE 1990s

TEACHING and computers



THE LESSONS OF LOGO

An Interview with Seymour Papert

MAKE A MILLION!
COMPUTER CRUSADERS: SPREADSHEETS
GRADEBOOK ROUNDUP

P9

SCHOLASTIC

Five Year Old Writes Life Story.

This story has many happy endings.

That's because five year olds are writing all kinds of stories in classrooms where teachers are teaching with IBM Language Arts Courseware.

IBM courseware developed with teachers for teachers

It all starts with IBM's acclaimed Writing to Read program*. It's a self-paced, interactive program that teaches kindergartners and first graders how to write anything they can say and read anything they can write.

And once students learn to write, IBM's Primary Editor Plus program gives them a simple and fun way to actually learn the fundamentals of word processing. So the skills your students use to write and edit their own life stories at five, will be with them at 25.

Writing to Read and Primary Editor Plus are just two of the many high-quality programs that run on the IBM PS/2 Model 25 desktop computer.

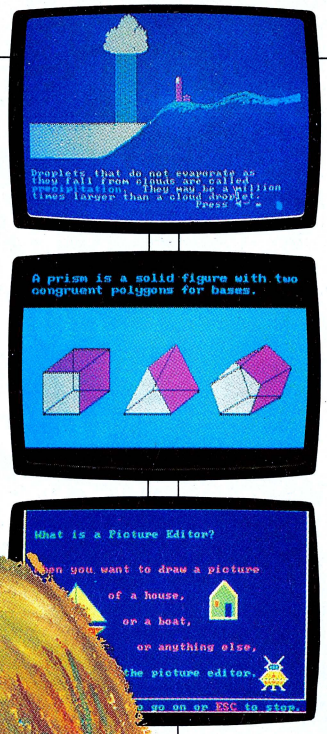
The Model 25 combines the power, speed and graphics capabilities of the IBM Personal System/2 family in a compact classroom desktop unit. Combined with our courseware, it puts a complete library of flexible teaching tools at your fingertips.

Thousands of schools are teaching English, math, physics, chemistry, foreign languages and much more on IBM PS/2s with IBM Educational Courseware.

And with good reason.

*Developed by Dr. John H. Martin

Our courseware has been developed with the help of over 200 active teachers nationwide. IBM makes courseware programs for students from kindergarten through high school —courseware that complements your curriculum and the textbooks you're currently using.



But courseware isn't the only way IBM is bringing subjects to life. IBM LinkWay, for example, is a new, fun-to-use interactive multimedia tool that actually combines full-motion video with sound, text and color graphics. With it, teachers can create their own special multimedia shows that work with their curricula.

And there's so much more we're working on to help you teach. Together we can help students watch atoms collide, listen to Shakespeare, master geometry with the ancient Egyptians— or help a five year old write his own life story.

For a free catalogue and/or classroom poster (please specify grade level), or for further information, call:
1 800 IBM-7257, ext. 152
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P.O. Box 3900
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MY LIFE
by
CHRIS HARRISON

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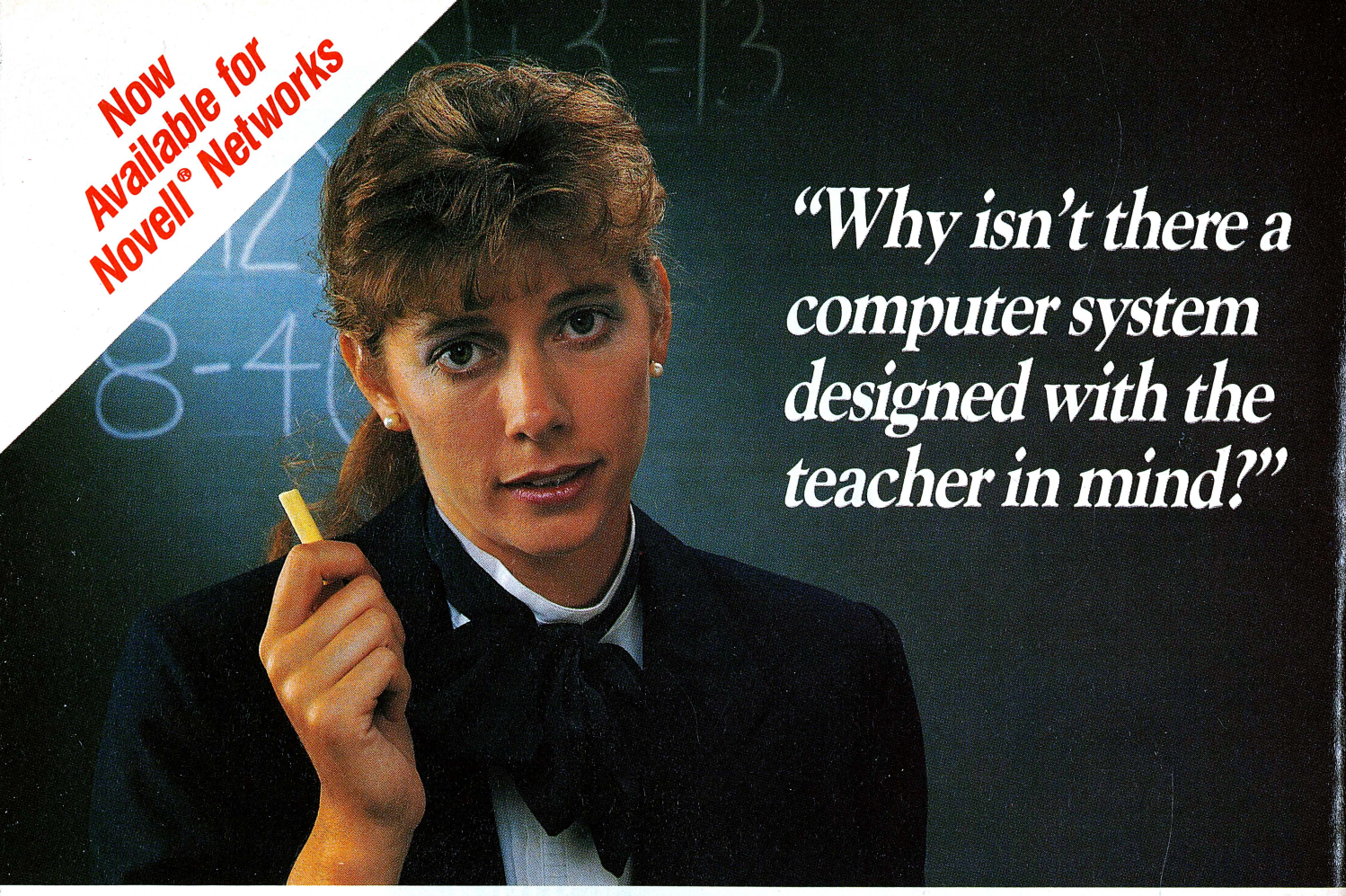

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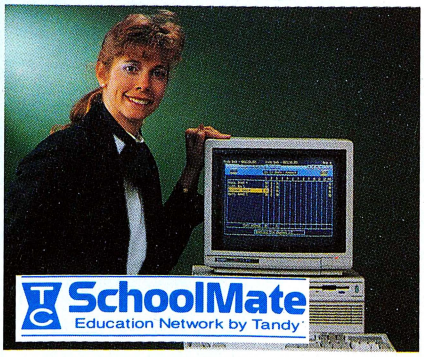

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TEACHING and computers

VOLUME 7, NUMBER 5 MARCH/APRIL 1990

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Cover photo by Kurt Stier

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FROM THE EDITOR

A Look Inside T&C

On Moving On

One of the most exciting things about educational computing is the way it supercharges professional development. It's not at all uncommon for previously mild-mannered elementary classroom teachers to begin noodling with computers and then suddenly find themselves conducting workshops at regional conferences and advising their state board of education about the future of technology. Whole new worlds open up for those who follow their curiousity about these machines, with a distinctive "ripple effect" that energizes all areas of their professional life.

The same holds true for those of us who *report* on educational computing, too.

On the strength of my work here at *Teaching and Computers*—including the whole array of special supplements we've been able to bring you over the past year—I've been offered a new position at Scholastic as editor of Sponsored Educational Materials. It's an opportunity to reach out into all areas of American education, and to help bring to teachers and students the highest quality of corporate-sponsored learning tools. It's an opportunity I'm looking forward to with relish.

The only drawback, of course, is having to bid farewell to *T&C*—which I must do with this issue. I'll miss very much the special dedication and enthusiasm of the computer-using teachers who make this magazine possible, as readers and contributors. I'll miss working with the crackerjack *T&C* staff, with its lively commitment to excellence. And I'll miss the field of educational technology itself, with its constant surprises and never-ending rhythm of change.

As part of my transition-period office cleaning, I spent the better part of a day combing through the accumulated files of *T&C*'s six-year publishing history. In the larger context of education, six years isn't much—which makes the evolution of educational computing all that much more remarkable. In 1983, our vertical files were heavy on BASIC tips and computer literacy resources; today's hot topics like curriculum integration, multimedia, and telecommunications were barely buzzwords yet. The field has become tremendously sophisticated and remarkably responsive almost overnight, it seems—and much of the credit must go to *you,* the determined and creative practitioners. I'm honored to have shared the journey with you.

Best wishes to us all for an empowered, exciting future!

M. Revenaugh

Revenaugh revs up behind the wheel as she starts on a journey at Scholastic.

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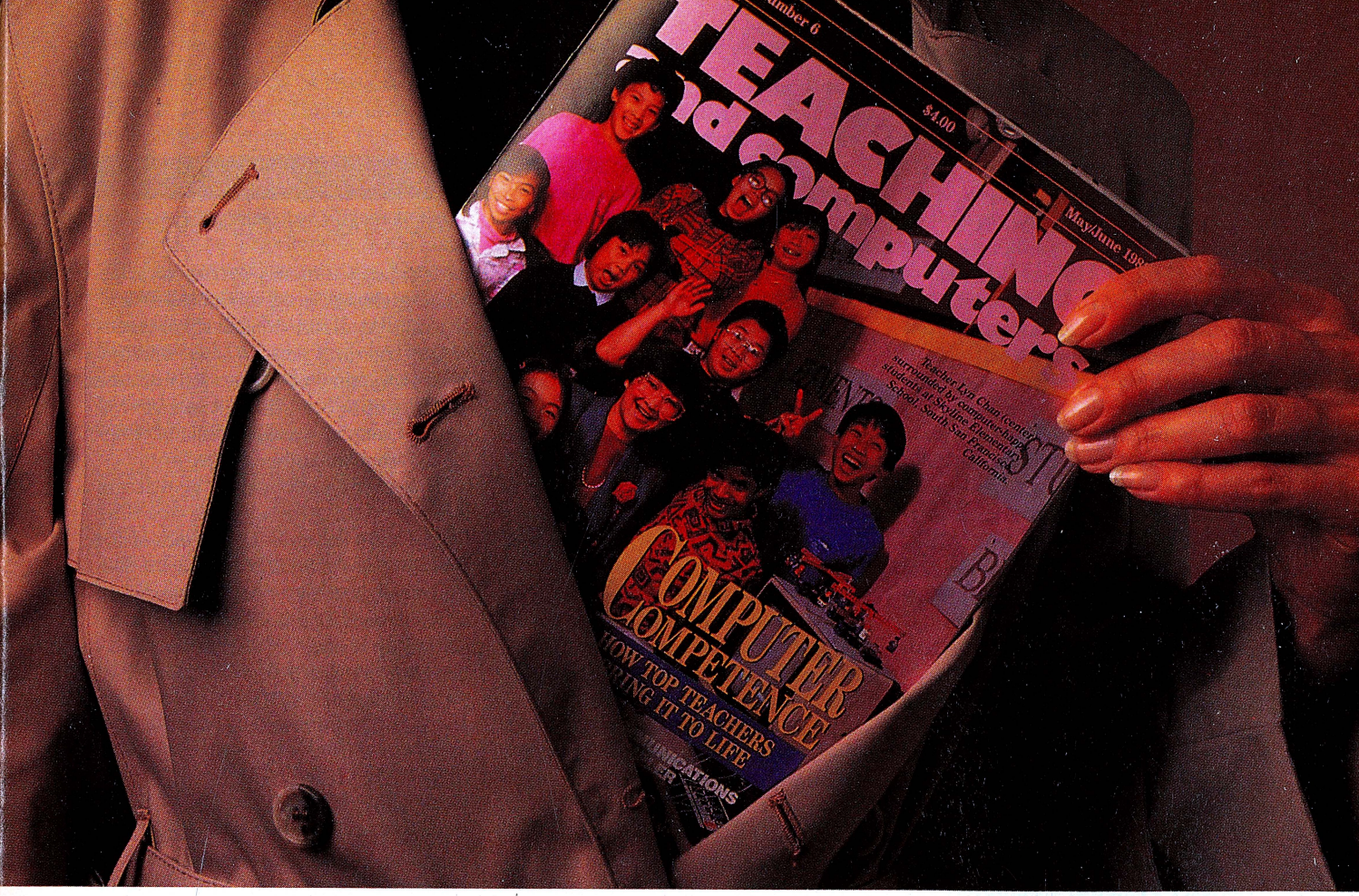

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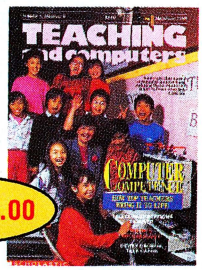

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UPDATE

News for Computer-Using Teachers

EDITED BY LOUISE C. ORLANDO AND BILL MORGAN GOSEWISCH

HAND-HELD HIGH-TECH LANGUAGE HELPERS

Franklin Computer has introduced two new hand-held computers.

The Speaking Dictionary Companion ($149.95) facilitates searching for words when proper spelling is unknown. Words typed in phonetically are corrected in seconds. An audio component verbalizes hard to pronounce words. Packaged with *Webster's Basic English Dictionary,* the computer also gives the page number for complete definitions of correctly-spelled words.

The Translation Master has over 250,000 English and Spanish words. Words from either language can be typed in phonetically for the correct spelling and translation. Users may also add to the computer memory 50 of their own words. Translation Master will be available this June for $299.95.

Contact Franklin Computer, 122 Burrs Rd., Mt. Holly, NJ 08060. (*Circle 100 on Product Info. Card.*)

WORDPERFECT SOFTWARE DONATIONS

Customers who purchase the *WordPerfect 5.1* word processing program are encouraged to donate their outdated *WordPerfect 5.0 or 4.2* versions to any elementary or secondary school.

As part of the donation program, WordPerfect Corporation will grant permission to the receiving school to use the software on one machine at no charge. WordPerfect is also offering discounts to educators to purchase personal copies for home use.

Contact WordPerfect, 329 N. State Street, Orem, UT; or call 800/321-4566. (*Circle 101 on Product Info. Card.*)

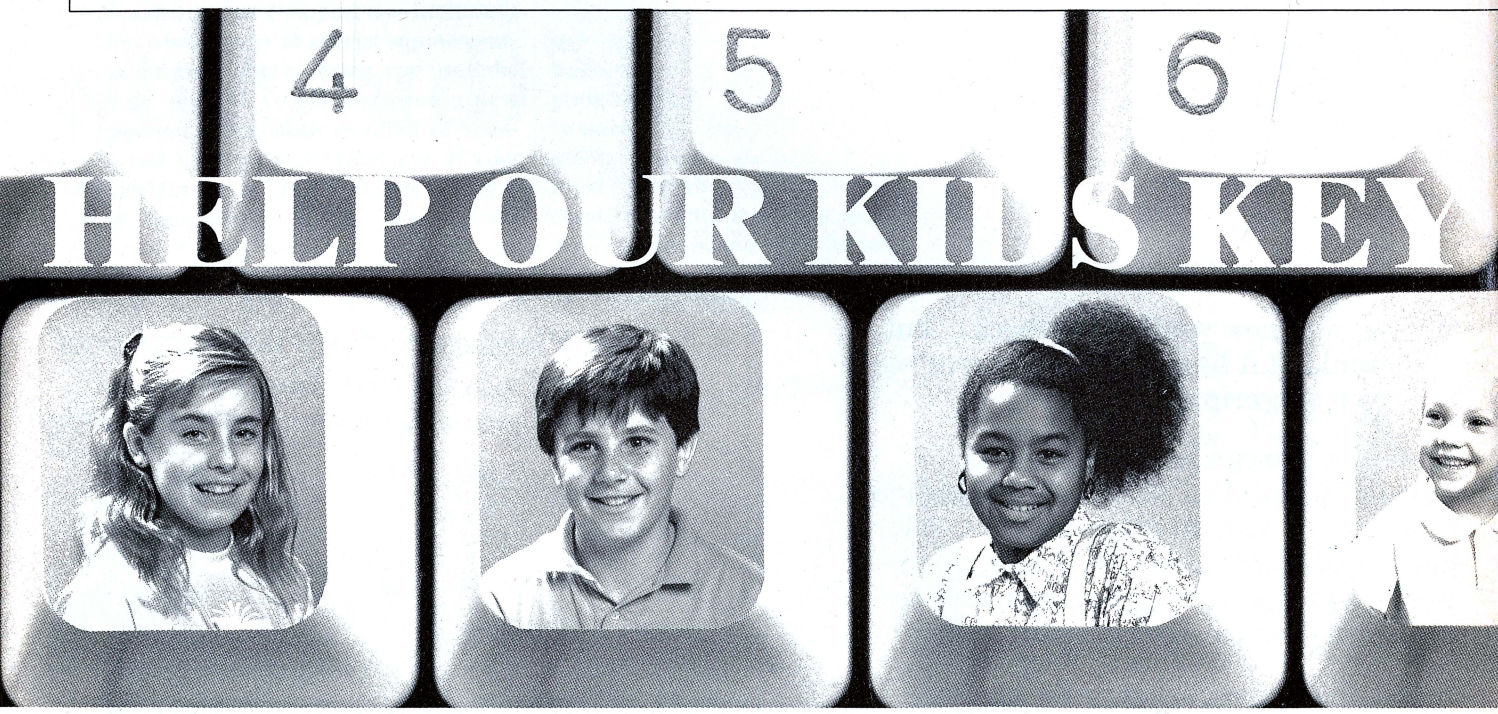
PLAN FOR SUMMER WITH HOME EXCHANGE

Three Long Island, N.Y., teachers have created a money-saving vacation home exchange program called Teacher Swap. Available exclusively to teachers, active and retired, the Teacher Swap Directory of Homes lists almost 400 "swappable" homes in over 32 states, Canada, Austria, Holland, England, Japan, and other countries.

It costs $32 each year to be listed in the directory. Although the deadline for the 1990 listing is past, copies of the Directory are available all year for $40. You need not list your own home in order to contact a teacher in the Directory. For a copy of the book, write Teacher Swap, Box 4130 Dept PR, Rocky Point, NY 11778. (*Circle 102 on Product Info. Card.*)

ORIGINAL DRAMA FOCUSES ON TEACHERS

An original drama, "Reaching Out," based on actual experiences of four teachers in Deer River, Minn., will be



Kids are key to America's future. And so are computers. By the year 2010, virtually every job in our nation will require some computing skills. That means preparing all of our youth today to take on technology tomorrow.

Our students' math and science scores are far below those in other countries. To excel in our high tech times, our kids need to catch on to computers. They're tools that can inspire them to think more independently. More creatively.

The Computer Learning Foundation is a non-profit organization that's taking the lead in computer literacy efforts nationwide. We're bringing together companies, state departments of education, national non-profits and local groups.

Our Computer Learning Month in October is a focus for thousands of community and classroom programs. We've involved millions in discovering the benefits of computing.

The Computer Learning Foundation is sponsored by: Academic Computing®, Britannica Software, Broderbund Software, Inc., Classroom Computer Learning, Compute!, Early Childhood News, Electronic Learning, Great Wave Software®, Jostens Learning Corporation, Logo Computer Systems, Inc., Scholastic Software™, Inc.,

shown this April in 24 cities. The program is part of the Thanks to Teachers recognition campaign. The drama describes how four Deer River teachers used technology to ease racial tensions between Americans and Ojibwe Indians.

Thanks to Teachers is a national effort by Apple Computer, the National Foundation for the Improvement of Education, the National Alliance of Business, and Group W Television to recognize excellence in teaching and encourage college students to seek careers in teaching.

NISSAN OPENS FAMILY LEARNING CENTERS WITH IBM EQUIPMENT

The Nissan automotive corporation is establishing three Family Learning Centers in an effort to improve the reading and writing skills of people of all age groups in the Los Angeles, Calif., area. Each center, to be operating within the first quarter of 1990, will focus on three IBM software programs: *Writing to Read, VALE* (the Spanish version of *Writing to Read),* and *PALS (Principle of the Alphabet Literacy System).*

All three software programs are based on phonemic spelling, letting students make an initial connection between the way a word sounds and the way it looks. Later in the program, the student makes a natural transition to standard spelling.

Nissan is supplying the learning centers with IBM computer equipment and software, and will pay for such supporting services as teacher training, installation, and service.

The following Los Angeles schools have been chosen to host the learning centers: Ann Street Elementary School, San Pedro Street School, and El Sereno Elementary School.

STUDENTS SIMULATE LIFE-CHOICES WITH TOM SNYDER PACKAGE

You see your best friend buying drugs. As you approach, he drops the drugs at your feet and runs. A teacher walks by, sees the drugs, assumes they belong to you, and asks for an explanation. What do you do?

This is just one of the simulated problems posed to students in grades 5-12 by *S.M.A.R.T. Choices* from Tom Snyder Productions.

The teacher-centered package, designed to act as a lead-in to group discussions of complex issues, works with one computer and up to 30 students. Students are given choices to make in the simulations and the choices lead to consequences, either good or bad, depending on what decision the student has made.

S.M.A.R.T. Choices comes with 30 student reference books, runs on Apple II and MS-DOS compatibles, and costs $119.95. Write to Tom Snyder Productions, 90 Sherman St., Cambridge, MA 02140.

(Circle 103 on Product Info. Card.)

SPELLING SOFTWARE FROM WEEKLY READER

Spelling Rules, a new language arts software program for students aged eight and up, has six levels of difficulty that let students advance through each level as they succeed. Teachers may also program in their own exercises, and customize them for remedial or advanced spellers.

The program runs on the Apple II family of computers. Contact Optimum Resource Inc., 10 Station Place, Norfolk, CT 06058.

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MICRO IDEAS

EDITED BY LOUISE C. ORLANDO AND JENNIFER JEROME

Quick Computer Tips and Activities

LOGOWRITER BORDERS ADD ZIP TO SHORT STORIES

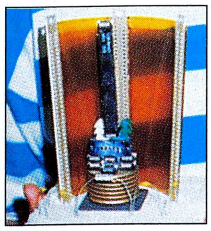
Putting a border around the screen for short pieces of writing is easy with the following *LogoWriter* (LCSI) BORDER procedure. We used it for Valentines day, but by changing the shape in the first line, you can use it for any occasion.

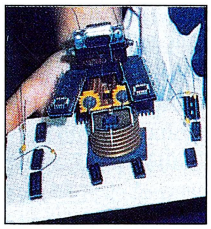
```
TO BORDER
  SETSH 14
  PU SETPOS [-130,80]
  PD STAMP
  SETH 90 REPEAT 12[PU
FD 20 PD STAMP]
  SETH 180 REPEAT 8[PU
FD 20 PD STAMP]
  SETH 270 REPEAT 12
[PU FD 20 PD STAMP]
  SETH 0 REPEAT 8[PU
FD 20 PD STAMP]
  HT
END
```

We used the following WEB program after reading *Charlotte's Web*. My students filled the spaces between the web strands with haikus they wrote about different characters in the book.

```
TO WEB
  RT 130 FD 1000
  LT 90 FD 500
  HT
END
```

Nancy Kuechle
Horace Mann School
Beverly Hills, Calif.



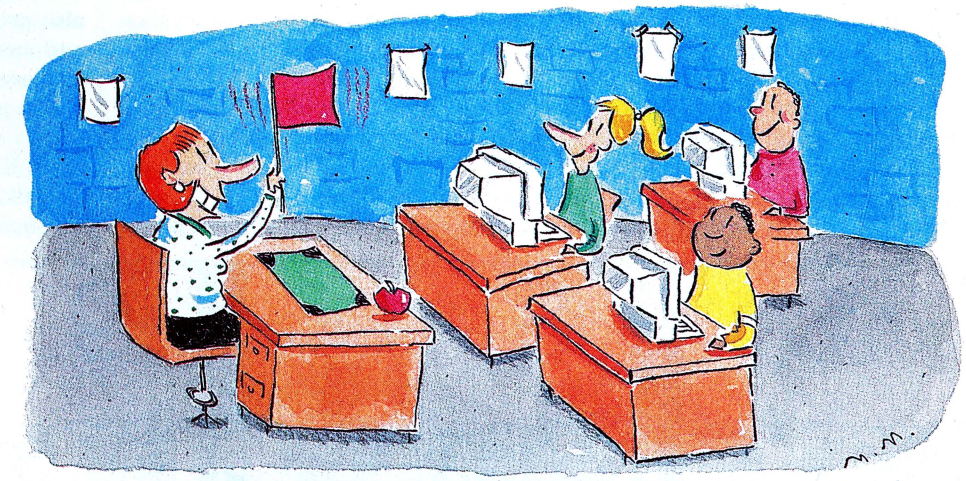


TURNING TRASH INTO TREASURE

What do you get when you mix old computer parts, bad disks, software boxes, paint, glue, and students? Robots and clocks, for starters!

My students turned the clutter in my classroom into working masterpieces. They made clocks from old disks, software boxes, and battery operated clock workings (which you can purchase at many discount stores). Robots were created from computer parts. When they were finished gluing parts together, out came the paint. Viola! Trash turned to treasures! And for the grand finale, each student used the word processor to write a short story about his or her creation.

Sandra J. Slater
Saudi Arabian International School
Riyadh, Saudi Arabia



MIKE MORAN

RED FLAGS GET STUDENTS TO STOP BEFORE THEY START

Red means stop, and when my students see the "red flag" flying on my desk, they know what to do.

You see, my students love using our computers so much that they frequently begin working as soon as they walk into the computer lab! This computer independence is wonderful, yet sometimes I have special announcements or additional instructions to give them. Regaining their attention can be difficult once they have started working, so when I know that I'll want it, up goes my red flag—actually, a sheet of red contruction paper attached to a dowel for display on my desk.

When my students walk into class and see the red flag flying, they know that I have something to tell them. Since they can't begin working until I'm finished talking, they quickly settle down to listen; they know that the sooner I can speak, the sooner they can get started!

Diane Cheshire
Utterback Middle School
Tucson, Ariz.

GRAPHICS EASE STUDENTS INTO WRITING

I motivate my students to write with "story starters" that I create with a graphics program like *Print Shop* or *SuperPrint*. First, I print a series of graphics using the banner choice. Then I place each graphic on a piece of lined paper and make photocopies of it. Finally, I hand these photocopied sheets out to my students who write their stories around the graphics.

Patricia MacDonald
Ken-Ton Schools
Tonawanda, N.Y.

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APPENINGS

What's Happening in Computer Classrooms

BY LOUISE C. ORLANDO AND JENNIFER JEROME

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school had another
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the computer store
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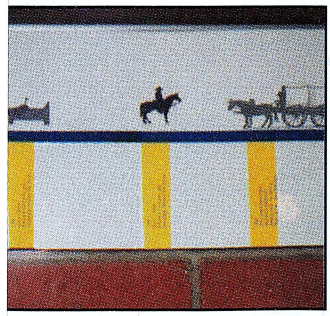
place and when
is there to help

ART APPRECIATION THE HIGH-TECH WAY

How can students become more informed about art before visiting a museum? The Detroit Institute of the Arts found the answer and tried it out on Shirley Nuss's Brookside/Cranbrook students in Farmington, Mich.

Shirley's students worked with *ArtWare,* a software program developed by the Department of Education at the institute. The software and accompanying materials introduce students to the museum's collections and familiarize them with the museum itself. The package, which is easily adaptable to other museums, features off-computer picture cards of the museum's most famous works. Important information about the artwork is listed on the back of each card. Students examine the cards carefully and then see if the computer, taking the role of thinker, can guess the artwork from the information supplied by the students.

When Shirley's students go to see "the real thing," they're armed with a great deal of knowledge about the well-known artwork that they're looking at.



puterized dateline.

data on a timeline. Strips of white posterboard measuring 8" x 28" were set out. Two students sorted and printed the data base in chronological order on multicolored mailing labels. As the students called out the data on the labels, other students used a graphics program to print out accompanying pictures. The rest of the class worked on assembling the completed graphics and mailing labels on the posterboard strips. Finally, the strips were laminated, and the finished timeline was displayed in the classroom. What a painless and pleasant way to review for an exam! ❦

MICRO IDEAS

LOGOWRITER BORDERS ADD ZIP TO SHORT STORIES

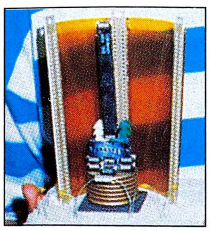
Putting a border around the screen for short pieces of writing is easy with the following *LogoWriter* (LCSI) BORDER procedure. We used it for Valentines day, but by changing the shape in the first line, you can use it for any occasion.

```
TO BORDER
  SETSH 14
  PU SETPOS [-130,80]
  PD STAMP
  SETH 90 REPEAT 12[PU
FD 20 PD STAMP]
  SETH 180 REPEAT 8[PU
FD 20 PD STAMP]
  SETH 270 REPEAT 12
[PU FD 20 PD STAMP]
  SETH 0 REPEAT 8[PU
FD 20 PD STAMP]
  HT
END
```

We used the following WEB program after reading *Charlotte's Web*. My students filled the spaces between the web strands with haikus they wrote about different characters in the book.

```
TO WEB
  RT 130 FD 1000
  LT 90 FD 500
  HT
END
```

Nancy Kuechle
Horace Mann School
Beverly Hills, Calif.



TURNING TRASH INTO TREASURE

What do you get when you m
puter parts, bad disks, softv
paint, glue, and students? I
clocks, for starters!

My students turned the cl

RED FLAGS GET STUD

**Red means stop, and wh
dents see the "red flag" fly
desk, they know what to do.**

**You see, my students love
computers so much that they
begin working as soon as the
the computer lab! This com
pendence is wonderful, yet s
have special announcements
al instructions to give them.
their attention can be difficul
have started working, so wh
that I'll want it, up goes my**

GRAPHICS EASE STUD

I motivate my students to w
gram like *Print Shop* or *Super*
choice. Then I place each grap
Finally, I hand these photocopi
the graphics.

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CLASSROOM HAPPENINGS

What's Happening in Computer Classrooms

BY LOUISE C. ORLANDO AND JENNIFER JEROME

GET A FREE COMPUTER FOR YOUR SCHOOL!

Think that's impossible? It's not, as George Pitlik, a computer teacher in Spring, Texas, recently discovered.

First George called his local newspaper and his school district's public relations person. They worked it out so that if he could get a computer donated to his school, a photo and story would be published in the local newpaper.

So George wrote a letter to the local Apple computer dealer, asking for the donation of a used computer. He guaranteed that a picture of the dealer giving the computer to the school would appear in the local newpaper. In his letter, George pointed out that the dealer probably wouldn't be able to get a lot of money selling a used computer, but the donation could be written off on his taxes, and that he would benefit from the free publicity. In addition, George told the dealer that as long as the computer remained in the classroom, a sign would be attached to it indicating that the dealer's store had donated it.

The donation was agreed on. A few weeks later, the dealer gave George, on behalf of his school, a spotless, reconditioned Apple IIe computer. The press published a story and photo of the event.

Everybody in this deal came out a winner! George's school had another computer, the newspaper had an interesting story, and the computer store got a lot of free publicity.

LOGO WITH A MUTANT TWIST

Ordinary Logo turtles have been turned into Teenage Mutant Ninja Turtles by students in Linn White's computer classes at Arbor Vitae School in Woodruff, Wisc.

Linn demonstrates turtle movement and direction to her classes with paper turtles, plastic Teenage Mutant Ninja Turtle action figures, and the stuffed Ninja character Leonardo. Since they began using the turtles and their "Heroes in a Half-Shell," her students have become even more enthusiastic about problem solving.

Students think the computer lab is a friendlier place and when someone is having "one of those days," Leonardo is there to help them through it, Linn says.

ART APPRECIATION THE HIGH-TECH WAY

How can students become more informed about art before visiting a museum? The Detroit Institute of the Arts found the answer and tried it out on Shirley Nuss's Brookside/Cranbrook students in Farmington, Mich.

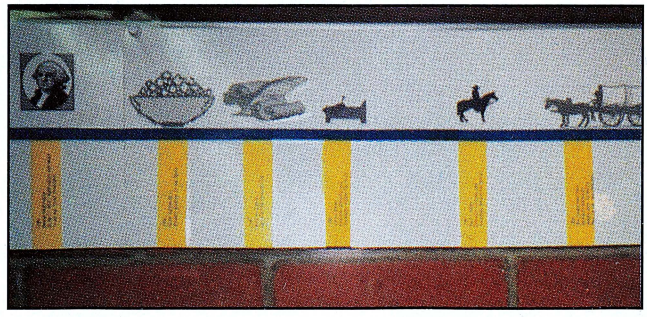
Shirley's students worked with *ArtWare,* a software program developed by the Department of Education at the institute. The software and accompanying materials introduce students to the museum's collections and familiarize them with the museum itself. The package, which is easily adaptable to other museums, features off-computer picture cards of the museum's most famous works. Important information about the artwork is listed on the back of each card. Students examine the cards carefully and then see if the computer, taking the role of thinker, can guess the artwork from the information supplied by the students.

When Shirley's students go to see "the real thing," they're armed with a great deal of knowledge about the well-known artwork that they're looking at.

DATA BASE PUTS HISTORY TO THE TEST

Instead of memorizing dates and names, social studies students in Susan Hickey's class at St. James School, in Texarkana, Texas, constructed a data base timeline to help them study for the final exam.

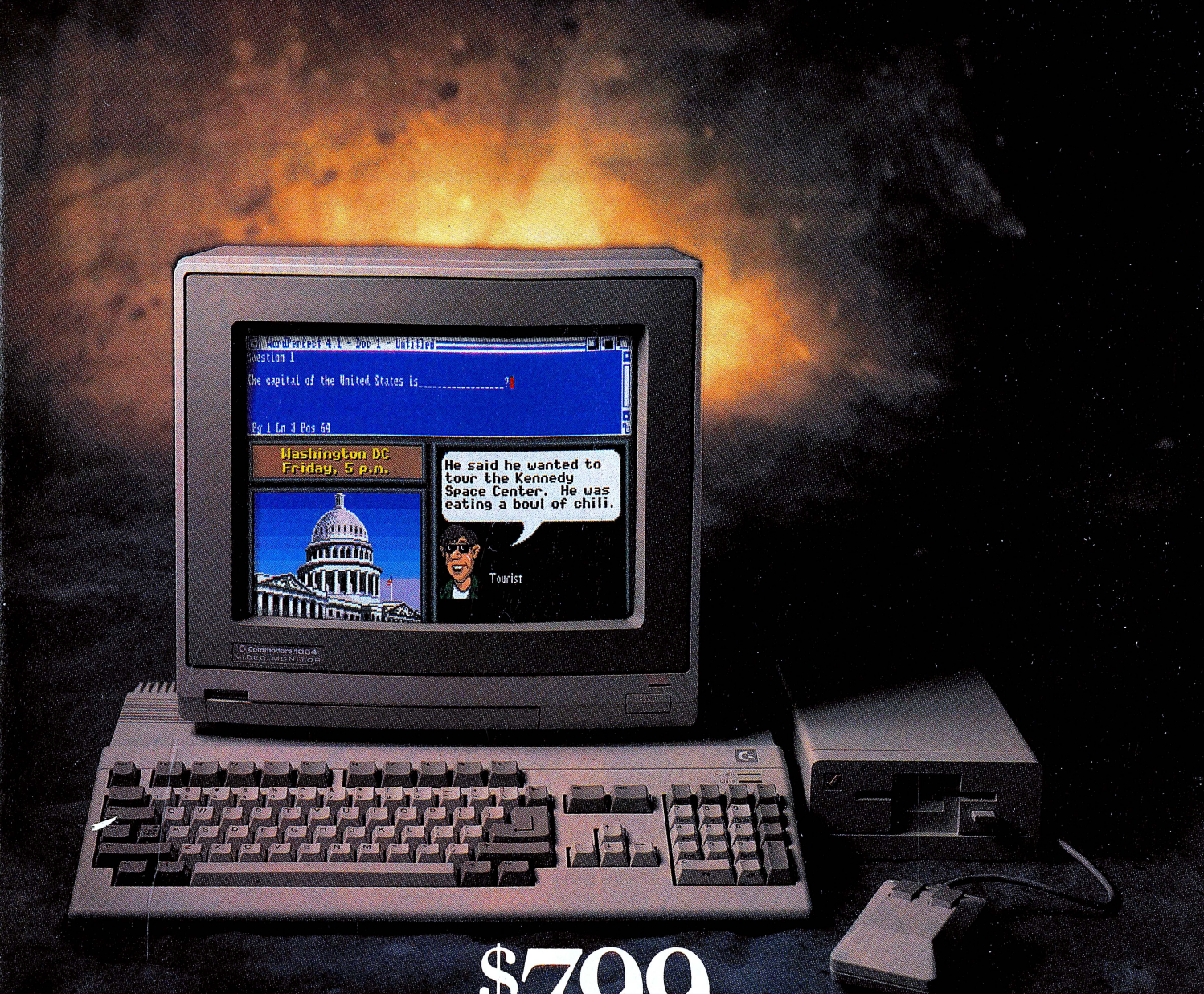
Using *AppleWorks* (Claris), Susan set up a data base of important people, dates, and events. Each student made an outline of facts from two chapters from the textbook and entered the information into the data base. One afternoon, the class took over the computer lab to assemble its data on a timeline. Strips of white posterboard measuring 8" x 28" were set out. Two students sorted and printed the data base in chronological order on multicolored mailing labels. As the students called out the data on the labels, other students used a graphics program to print out accompanying pictures. The rest of the class worked on assembling the completed graphics and mailing labels on the posterboard strips. Finally, the strips were laminated, and the finished timeline was displayed in the classroom. What a painless and pleasant way to review for an exam!



Students study history with computerized dateline.

$1356*

This used to be the best deal on a computer.



$799

Now it's this one.

Announcing Commodore's Computers for Teachers Program.

Look at the left page. It was the best computer bundle in the world for less than $2,000.

Was? Yes, was. Look at this page. That's the price right now, if you happen to be a qualified teacher.

The computer is the Amiga 500, The Computer for the Creative Mind.™ It has the ability to save you time on school tasks, of course. It can also make your *own* time more productive and, yes, more enjoyable because of Amiga's unique color, sound, and graphics ability. Not to mention Amiga's multi-tasking capability that alone makes it a great choice.

Included, for that price, is a memory expansion card that turns the Amiga 500 into a powerful one megabyte computer. Plus there's an external floppy disk drive and one of the sharpest monitors you can find at any price, the A1084 RGB color monitor.

Why this concern for teachers on the part of Commodore? One, teachers being teachers, they'll help us introduce Amigas to everyone simply by owning one themselves. And two, an unselfish reason: we believe that it's the perfect computer for educators, and we want to make sure they can get their hands and minds on them.

But there are more choices for teachers who have a need for MS/DOS® capability and more power and performance. For example, there's the A2500/30/PC system that offers MS/DOS compatibility plus the power and imagination of the Amiga. This is the one that people are buying all over the country for $6,697.** As a teacher, you can get this powerful system for only $3,679. A remarkable savings, don't you think?

For additional details on the full line of Amiga products and programs, call 800-627-9595 (Ext. 500). They'll help you find the nearest Commodore Education Market Specialist.

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INSERVICE WORKSHOP

A Guide for Teachers Helping Teachers

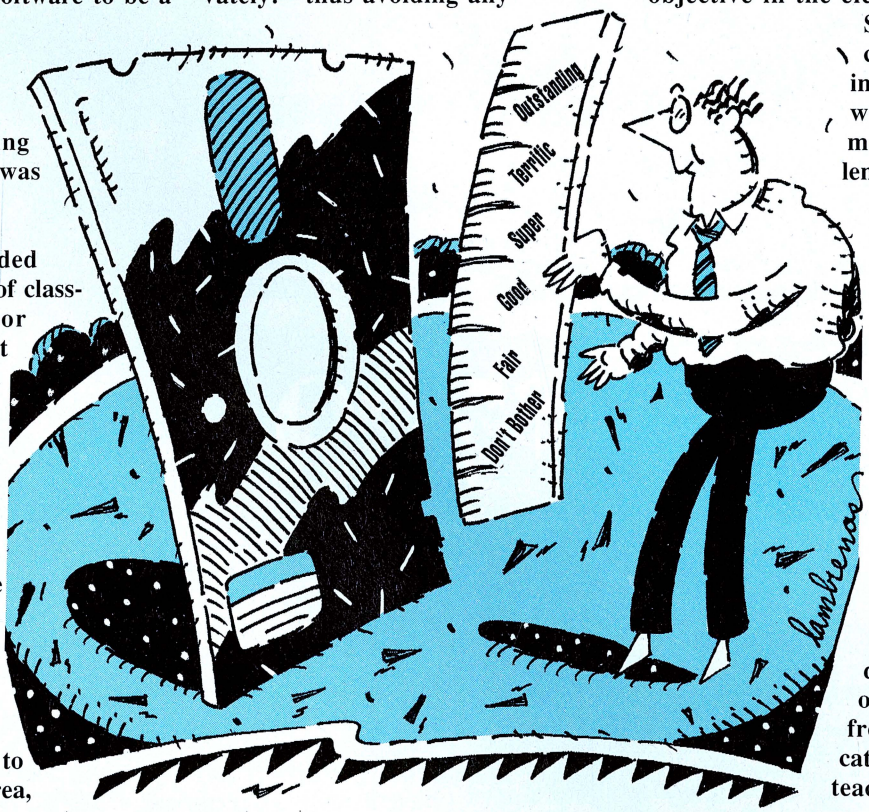
BY CAROLYN FETNER AND KAY JOHNSON

Selecting Software . . . Who, Me?

Teachers at Gung Ho Elementary are "up" on what's "in" in educational software. When computers first began invading the educational scene, Gung Ho teachers began experimenting with software, in search of a wide variety of skills and approaches to ensure success for all students. Once they learned what type of software was available, the characteristics of quality programs, and ways to match software to their classroom needs, they found selecting software to be a snap!

WHAT AM I LOOKING FOR?

The first thing Gung Ho teachers learned was how to ask themselves certain key question about what they needed and wanted in terms of classroom computing. For example, into what subject area do I want to incorporate the computer? Will I be using it to practice basic concepts, provide remedial help, provide enrichment, or all three? Will I be using the computer with the whole class, with small groups, or with individual students? Given all of the other material I plan to use for this subject area, how much time will my students have to work with this software? Use the handout on page 14 to help teachers ask—and answer—these questions for themselves.



SOFTWARE SPECIES

The next thing Gung Ho teachers wanted to learn was how to sort software into types.

• *Drill and practice* is the kind of software they found surfacing most often—and with good reason. Kids have historically learned facts using this method, a method consisting of one person calling out questions and one answering. The computer eliminates the need for such a duo. Not only do good drill and practice programs provide the questions, but instant feedback as well. This feedback, often in the form of exciting graphics displays, offers the student the opportunity of a second chance to achieve the objective, and failing this, the answer itself—privately!—thus avoiding any embarrassment.

• Another type of software Gung Ho teachers encountered was the *tutorial,* which teaches a concept from scratch. Gung Ho teachers are somewhat hesitant to rely on a computer program to teach content for which a student will be held accountable. They prefer to use the tutorial as reinforcement—except in the case of keyboarding tutorials, which are especially valuable because of their direct connection to computer skills.

• *Simulation* programs are a "turn-on" for Gung Ho students—not to mention their teachers and parents. These programs, while presenting life-like situations, also require decision making, calculating, and long-term planning. What a perfect way to relate education to the real world.

• *Problem solving* software fits right in with an increasing emphasis on problem solving as an educational objective in the elementary school. Students love a challenge, and the intrigue intensifies when they can meet these challenges using a computer.

• Also gaining popularity among Gung Ho teachers is *"tool"* software, such as graphics programs, word processors, data bases, spreadsheets, and more.

When planning an inservice on software selection, build in time to demonstrate one or more programs from each of these categories, and help teachers brainstorm ways that each might be used in real classroom settings.

REVIEWS AND PREVIEWS

Once teachers have a sense of their software needs and a general idea about the kinds of packages available, they can move to the "fact-finding" stage of their software search. They'll need to learn several methods of identifying possible packages.

•Reviews. Your school or district

JIM LAMBRENOS

probably has on hand a variety of sources of software reviews, including computer magazines (like this one), books such as *Only the Best* (R.R. Bowker, New York, N.Y.) or *TESS* (EPIE., Water Mill, N.Y.), or your own evaluation reports. Show teachers how to use these resources by modeling a search for a particular kind of program—for example, a science simulation program for independent study use by kids in grade 5. Emphasize the key types of information teachers should look for in reviews, beyond the overall quality of the program—such as its ease of use by students, its pedagogical approach, and its price. Encourage teachers to cull a list of one to three programs that are potential "winners."

• Word-of-mouth. Don't let teachers overlook their colleagues as useful sources of information about software. Encourage them to ask each other for leads about what works and doesn't work in a classroom. This "word of mouth" kind of research may well go beyond your building to other schools in the district—or even to state and regional educational computing groups.

• Previews. Once teachers have a short list of possible packages, encourage them to try before they buy (or borrow, if you're operating a central software library). More and more, companies are providing the opportunity to preview software before actually purchasing. This provides teachers with an opportunity to run through their own checklist of "winning ways" (see next section) as well as to submit the software to its true test: how well it works when actually used with students.

WINNING WAYS

Suppose a program fits a teacher's curriculum objectives and classroom set-up. What else should he or she look for before saying yes to this software?

• User friendliness. Just as we seek out friendly people with whom to

LogoWriter® Activity #2 #3 #4 #5 #6

There's No End to What You Can Do With LogoWriter

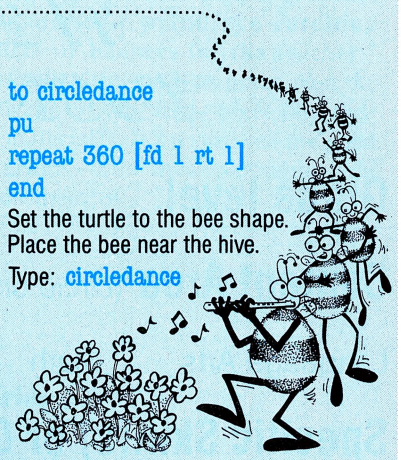
Why? Because no other educational package offers so many fully-integrated features – turtle graphics and animation, word processing, Logo programming, music, plus comprehensive learning materials. Here's just one idea!

BEE DANCE
(Science/Communication)

Karl von Frisch, a zoologist, discovered there is a bee language. Bees communicate by carrying out special "dances." Each of the two types of dances – circling and wagging – gives different information about where food is located. Find out about how bees move and what they eat. Use LogoWriter to draw a hive and, in the distance, food. Create a bee shape. Then write a dance procedure:

```
to circledance
pu
repeat 360 [fd 1 rt 1]
end
```

Set the turtle to the bee shape. Place the bee near the hive. Type: circledance



Going farther: Define a wagdance procedure. Is the food closer or farther away? Show how other animals communicate through movement. How are bee dances different?

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THE • INSERVICE • WORKSHOP • Handout #5 •

Name:_____
Grade(s) taught:_____

WHAT DO YOU WANT YOUR SOFTWARE TO DO?

Grade level:_____

Content Area (circle one)

Language Arts Math Science Social Studies Other (specify) _____

Specific Skill(s) or Objective(s) (circle one)

I want to use the computer to:

Reinforce skills Teach skills Enrich subject Promote creative expression

Computer Resources (circle one)

One computer Two to five computers Computer lab

Preferred student/computer grouping (circle one)

Individual students Small group Whole class

Computer type (circle one, if known)

Apple IBM Commodore Tandy Other_____

RESEARCH RECORD

Software title _____

Publisher _____

Machine requirements_____

Price _____

Your final choice _____

_____

Share your best "finds"—and this completed sheet—with your colleagues!

spend our time, the computer "experts" at Gung Ho Elementary select computer software that is "user friendly." Software that provides easy-to-follow directions and simple documentation is a must. Educators just don't have time to spend trying to "make a program work" over and over. User friendly software is in great demand by teachers and students.

• Individualization. Once the program works, teachers demand much more than just "friendliness." A program that allows for individualization (one that allows for different students to work at different levels of ability) is a true teacher aid. The ability of the teacher to prescribe and manage the computer efforts of the students is invaluable—a perfect example of incorporating the computer into the teaching curriculum.

• Record keeping. Teachers want the computer to help them keep track of how students are performing on the tasks the software presents. Programs that keep student records and help analyze errors are favored among teachers.

• Student reaction. Students demand even more than their teachers, if they are to stay involved in the activity. Programs that give immediate feedback, reward correct answers, correct wrong answers, and eventually provide a right answer become true friends to the student. What's more, the computer should offer students a means of interacting with a program to input the right answer or make a decision. Teachers at Gung Ho Elementary know that this active involvement, combined with high quality graphics, will hook a student every time. Each student gets a non-judgmental, private tutor—a dream come true.

SPREADING THE WORD

Once a teacher has found a piece of software that works, encourage her or him to toot its horn, in one or more of the following venues:

• At a grade level or subject specific inservice session. Who better to tell a teacher what works than another teacher? When teachers leave, they are equipped with a new tool for their classroom. Inservices held on a regular basis provide teachers with the opportunity to acquire many such tools in a short amount of time.

• Faculty meetings! Just two minutes is enough time to tell of a new program and what it will "do for you." *Teachers will beat a path to your door before the meeting is over.* Be sure you always have documentation (directions) available to accompany the software as teachers "try it out."

• In the school newsletter. "Extra! Extra! Read all about it! New software at Gung Ho Elementary . . ." Such a proclamation in the newsletter is certain to promote interest in any new program.

• On the walls, in the halls . . . . Encourage teachers to use graphics programs to print eye-catching posters or banners for the teachers' workroom, the mailbox area, even the restrooms (what better place for reading material?). It's a sure sell for good programs—and their colleagues will thank them!

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The Federal Depository Library Program

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WELL-MANAGED CLASSROOM

Computer Solutions for Your Administrative Tasks

BY ELAINE YAFFE-BLUMENTHAL

Gradebook and Testmaking Software Tools

Classroom teachers are a diverse lot, yet they all share one unique problem: how to find the time necessary to do their jobs. Poll any group of teachers, and inevitably they'll tell you that their biggest time usurpers are testmaking and grading.

Here's where the computer can help. Even if you haven't figured out how to integrate computing into your language arts lessons, you can learn to use the computer—quickly and easily—to help you expedite your classroom management responsibilities of testmaking and grade tracking.

I looked at six gradebook and testmaking programs that function within Apple II, Macintosh, and MS-DOS computer environments. My goal was to assess the management needs of the classroom teacher and help alleviate some of our time constraints. The proper tools in a well-managed classroom should help the teacher, not add an extra task to an already burdensome schedule.

WHO ARE THE TEACHERS?

While all teachers have common needs, not all teachers' needs can be necessarily met with the same tool. Teachers differ greatly in their comfort level and experience with computers, and as I looked at programs I considered the two poles of experience:

First, I considered the computer literate classroom teacher who enjoys the challenge of reading software documentation. This teacher likes to know all the ins and out of a program and will use a program to its fullest extent.

Second, I considered the computer novice classroom teacher who usually doesn't like to read manuals. Due to time constraints, an unfamiliarity with computer language, and general apprehension, these teachers tend to want to be able to run the program without have to read the documentation.

Each of the following reviews will contain a short program summary, followed by a breakdown of its strengths and weaknesses, directing attention to the needs of both the literate and novice computer-using teacher according to the following criteria:

1. Stress Factor—How straightforward is the documentation? Will it take an enormous amount of time to learn. Can the teacher go through the tutorial portion of the software within a reasonable amount of time? Is the program set up in such a way that it's easy to use with or without the documentation in front of you?

2. Purposefulness—Is the software useful to an elementary school teacher? Is the price of the software comensurate with its use and application?

3. Ability to be extended for curriculum development—Is the software flexible enough to allow it to be customized to particular subject areas? Can the teacher easily adapt these programs to generate tests, worksheets, record student progress, and keep track of grades?

WHAT ARE THE PROGRAMS?

CLASSROOM TOOLBOX

The title says it all! This *is* a toolbox for the classroom, something that can be used by both the classroom teacher and students alike. It is the most versatile test and worksheet generator I have seen in a long time and one that every instructor should have access to.

Once a question and answer file has been created, several different types of worksheets and tests can then be generated using the same file—no need to retype data for each new format. Available formats include fill-in-the-blank, matching, true/false, and multiple choice. No more using canned crossword puzzles and word finds—now you can create your own that fit right into your curriculum.

***Computer Literate Teacher*:** A few quick glances at the documentation allowed me to create a multiple choice, matching, word jumble, word find, and crossword worksheets. When I showed some classroom teachers what this program could do they instantly wanted it.

Computer Novice Teacher: The ease of use is an important point. Teachers without any computer background can easily create a worksheet by following the instructions on the screen, or by reading the nontechnical language in the documentation. As with all Sunburst programs, technical support is available by calling their toll free number.

Sunburst Communications: 101 Castleton St., Pleasantville, NY 10570; 800/628-8897
Computers: Apple II family
Memory and Hardware Requirements: For custom designed worksheets 128K is needed, but instructions are supplied for 64K users to simulate 128K capabilities, but only if they have 2 disk drives; a printer is required.
Price: $69.00, backup included

MAXAM AND MAXPAGE

MaxAm is a *HyperCard* testmaking program that allows teachers to create test "stacks" easily and quickly. The beauty of this program is two-fold: its on-screen testing capabilities include immediate, on-screen scoring; its hypertext capabilities allow teachers to create multi-level tests in which students can branch to different levels as they progress.

MaxAm works with *MaxPage*, a versatile, affordable, easy to use page making program. Pictures, graphs, charts— anything created in *MaxPage*—can be easily imported into a test created with *MaxAm.*

MaxAm and *MaxPage* are two software packages that a school can feel good about purchasing for the faculty to use over and over again.

Computer Literate Teacher: The documentation for both programs is easy to follow. *Max Am* helps teachers create whatever kind of test stack they desire. In *MaxPage,* the user can go through the tutorial in a short amount of time and will find this program easier to use than most other desktop publishing software.

Computer Novice Teacher: Those not familiar with the Macintosh environment might be turned off by the vocabulary used in the documentation. But if "stick-to-it-ness" prevails, novices will learn to use the software within two hours. It is worth the time spent learning these two pieces of software.

Applied Systems and Technologies Inc: 227M Hallenback Rd., Cleveland, NY 13042; 315/675-8584
Computers: Macintosh, Plus, SE, II
Memory and Hardware Requirements: Minimum 512K; printer is optional but recommended for desktop publishing purposes and printout of worksheets and tests.
Price: *MaxAm,* $69.00; *MaxPage,* $89.00; the *Max Pack*, $149.00

Microcomputer Testing Sytem

AppleWorks users celebrate! The *Microcomputer Testing System (MTS)* is a comprehensive teacher utility program that allows you to use *AppleWorks* to create on-screen and printout tests and quizzes for your students. *MTS* has the power to randomize questions and keep track of student scores, all within your *AppleWorks* program.

After loading *AppleWorks* and the *MTS* program disk, teachers type in their test questions following the simple *MTS* format. A test is then saved on an *MTS* data disk as *AppleWorks* database file. Students taking the test simply load up both *AppleWorks* and *MTS* and take the test on screen. Students can also take the tests at their desks via printouts, but then you can't take advantage of *MTS*'s scoring capability.

The software also allows teachers to add remediation or study guide material for each question. At the end of the test, the computer can display or print out the questions students missed and any study material that the teacher has included. Lastly, teachers can create worksheets to accompany any study materials.

Teachers without *AppleWorks* (but with a compatible word processor) can use this program if they save their file as an ASCII file.

Computer Literate Teacher: The documentation is very easy to follow. You can create your own tests within 45 minutes. Knowing *AppleWorks* makes this program a valuable accessory to an already powerful educator tool.

Computer Novice Teacher: The documentation is easy to follow for the novice who has some basic understanding of the use of *AppleWorks*. If using another word processor that will save to a standard ASCII file, the novice will have difficulty following the documentation since the graphics and terminology are for *AppleWorks* users.

Educational Activities Inc.: P.O. Box 392, Freeport, NY 11520; 800/645-3739 (U.S.), 516/223-4666 (N.Y.)
Computers: Apple II family
Memory and Hardware/Software Requirements: 128K; printer is optional but beneficial for printouts of tests and scores; *AppleWorks* program disk (or compatible word processor).
Price: $69.00

The Greater Grader

This program was designed for the elementary school teacher who, unlike a high school counterpart, can teach five or six different subjects, and within each subject area can have several different sub-groups of students (Reading Group A, Reading Group B, and so on). The program has the capacity to keep the grades for an unlimited number of assignments for up to 60 students.

Teachers want to be able to track their students' progress in different subjects and this program allows them to do just that. This tracking information can then be used to create individual performance reports. Teachers can add anecdotal notes on behavior as well. The program averages and weighs grades, and does grade percentages as well.

Computer Literate Teacher: The amount of time needed to go through the documentation is well spent. The tutorial leads you step-by-step through the program's functions and allows you to progress with ease through the program. For the teacher who uses the computer as a tool and is willing to spend the initial time to plug in the data of students' records, this program is an added plus.

Computer Novice Teacher: The computer novice may find the tutorial documentation cumbersome to go through and may not stick with it to the end.

Ability Systems Software Answers: 184-18-67th Avenue W., P.O. Box 5888, Lynnwood, WA 98046; 206/778-7202
Computers: Apple IIc, IIe, IIgs
Memory and Hardware Requirements: 64K; printer is recommended.
Price: $74.95 with non-copyable backup; $94.90 with multi-copy backup

The Aeius Gradebook

This program uses a window approach for selecting options so you can move around the program easily. A HELP menu is available at any given point as you progress through the program.

The flexibility of the program is wonderful in terms of averaging grades and calculating percentages. It also weighs grades and will work with most of the widely-used grading systems.

The program quickly highlights missing grades for any given student, thus allowing teachers to see at a glance what makeup work must be done. A student's highest or lowest grade can be quickly found, which is a nice little function for checking students' progress. Daily or weekly progress reports can be printed out and a grade posting report using student codes can be automatically printed for all classes.

Computer Literate Teacher: The computer literate teacher can be up and running within 45 minutes. The beginning of the tutorial is very simple and the computer literate teacher will sail through this section quickly. The greatest effort on the part of the teacher is entering student data.

Computer Novice Teacher: The documentation is quite basic. The novice will feel very comfortable following the tutorial and using the software. It is well worth it to invest the short amount of time to learn this software and to enter student data.

Aeius Corp.: P.O. Box 700451, San Jose, CA, 95101; 408/257-0658
Computers: MS-DOS
Memory and Hardware/Software Requirements: 128K; PC-DOS or MS-DOS Version 2.0 or later.
Price: Shareware; program disk with no support, $10.00; registered user price (includes program, printed manual, telephone support, update notification), $35.00; site licenses available.

Elaine Yaffe-Blumenthal is a computer specialist/instructor for the River Edge Schools, River Edge, N.J.

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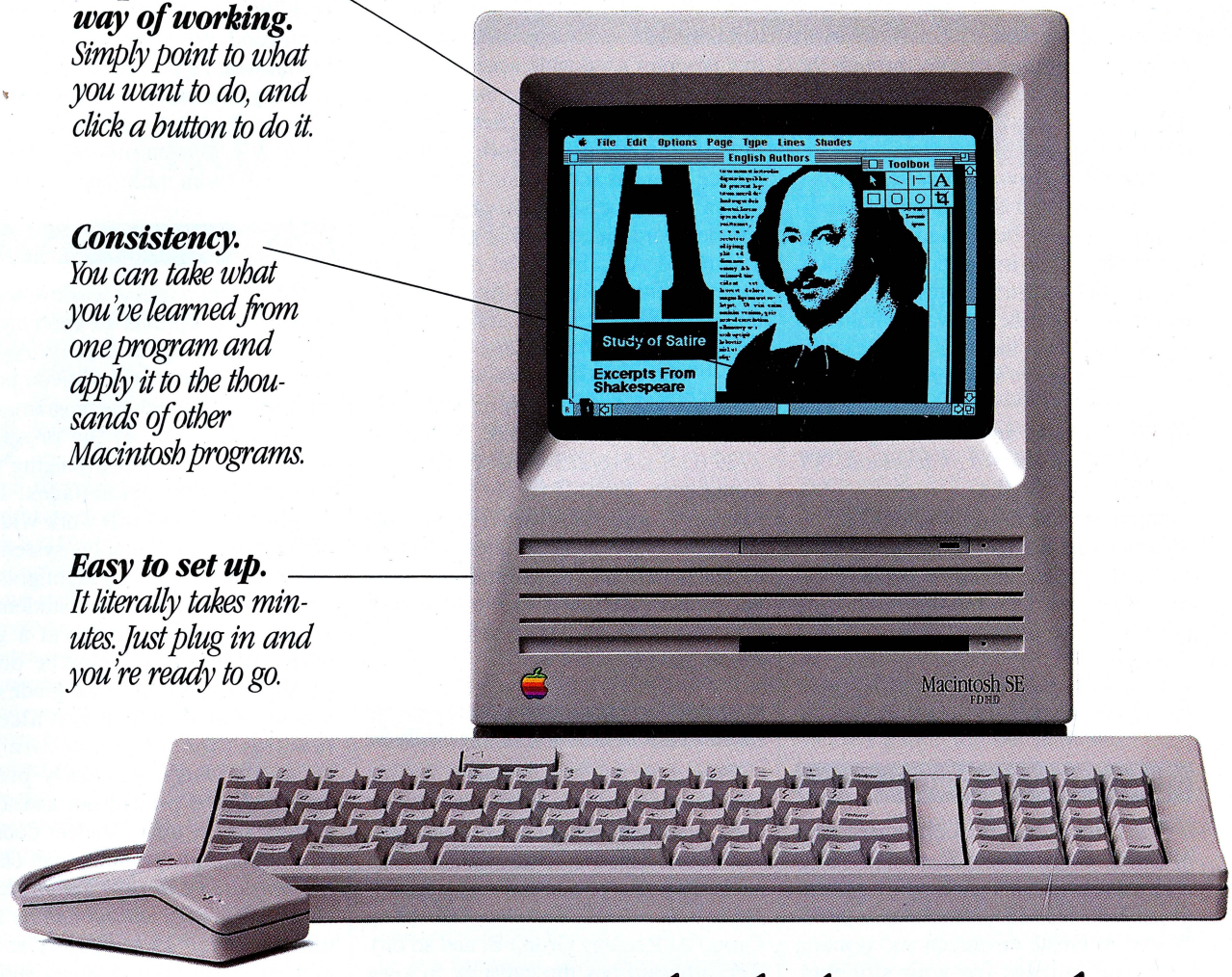

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THE LESSONS OF LOGO

BY LOUISE C. ORLANDO

*It was almost 25 years ago that Logo—the first programming language for children—was born. Today, we have two other forms of Logo—*LogoWriter *and* LEGO TC logo. *Ten years ago,* Mindstorms: Children, Computers, and Powerful Ideas *fueled the fires for educators opposed to everyday teaching practices. Now, as* Mindstorms *is being translated into Russian, The 1990's version of it is in the works. What better time to hear from the man behind all of this—Dr. Seymour Papert?*

Teaching and Computers' *associate editor Louise Orlando recently spoke with Dr. Papert in his office at the Massachusetts Institute of Technology, where he is a professor of mathematics and education. Here is her interview:*

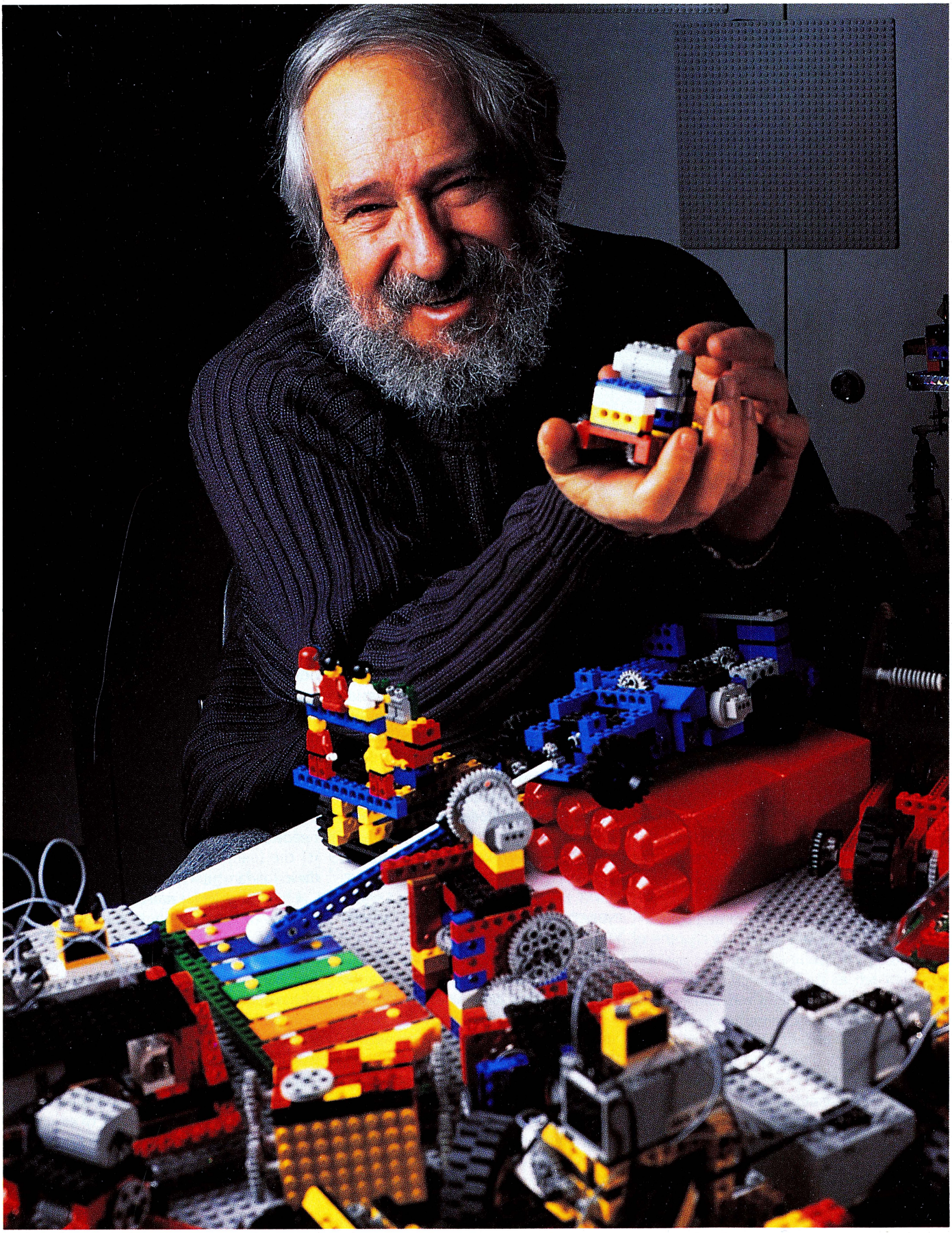
➤ HAS LOGO TURNED OUT THE WAY YOU EXPECTED, IN TERMS OF CLASSROOM USE AND STUDENT IMPACT? IF NOT, HOW HAS IT TURNED OUT DIFFERENTLY?

At first, I used to be very upset when I saw schools using Logo in a rigid way, making it just another curriculum subject with a test, almost rote learning. I stopped being upset by that when I came to the understanding that [everyone] can use Logo as a personal mode of expression according to a personal style.

Many teachers believe in a very highly structured, teacher-centered, authoritarian [approach to] education. It's not surprising that they use Logo in this same way. It's not my business to try to persuade them to be different, because they should be who they are.

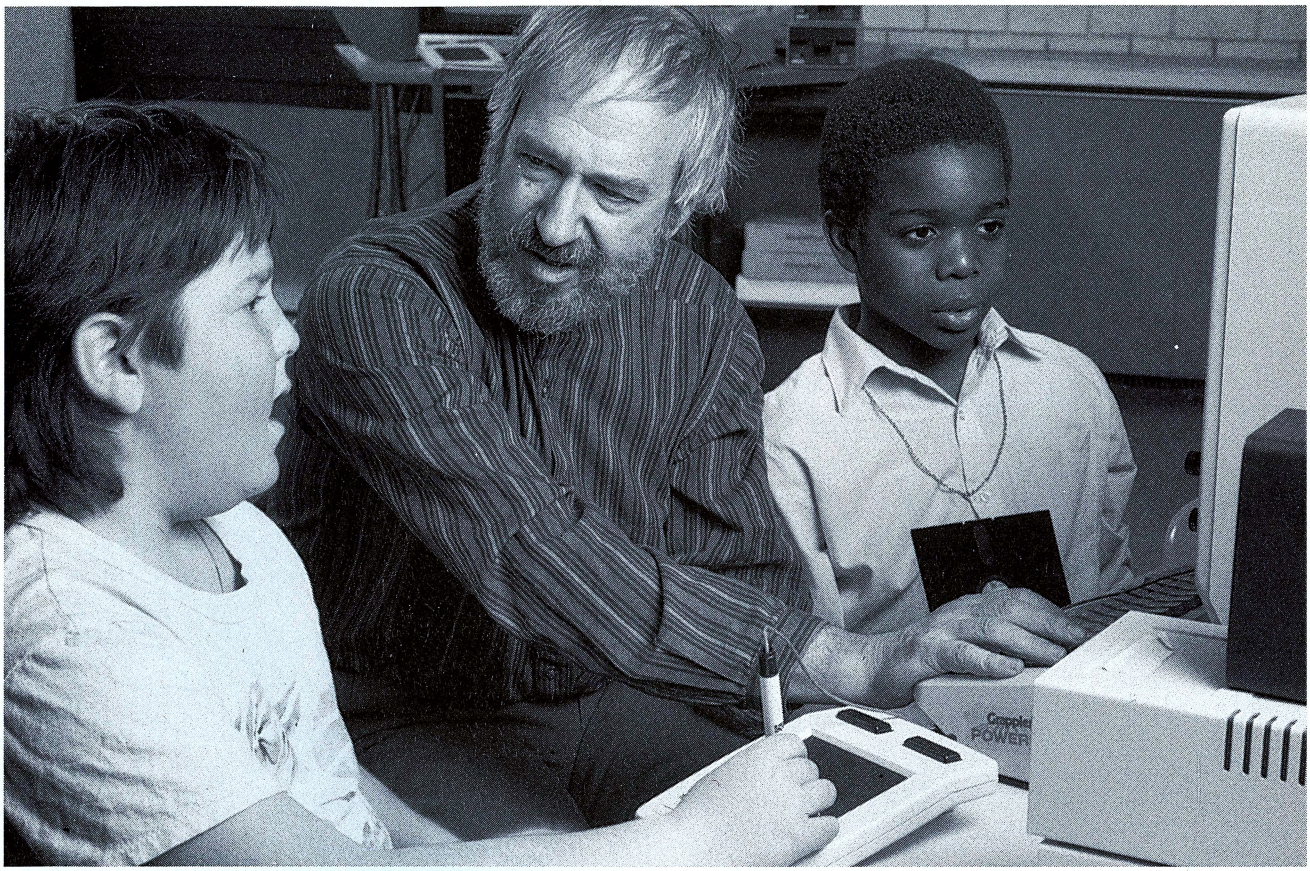
What I find most exciting, though, are teachers whose instincts are towards open education, encouraging individuality and creativity in children. I am pleased by the way that these teachers use Logo to do better what they have always been doing — teaching.

So the question doesn't have a simple answer. Some



Dr. Seymour Papert, creator of Logo and author of *Mindstorms*.

Kurt Stier



Dr. Papert assists students as they work with Logo.

I THINK THAT [IT IS] MOST IMPORTANT THAT PRINCIPALS TAKE TEACHERS MUCH MORE SERIOUSLY AS THINKERS AND AS ACTIVISTS.

aspects of what was expected [for Logo] are still for the future. Some aspects are being carried out wonderfully by teachers whose philosophy of life is compatible with the way I look at education, and I'm pleased with that. As for the teachers with philosophies not like mine, I shouldn't be surprised if they use Logo in their own way.

➤**PROPERLY PREPARING TEACHERS TO USE COMPUTERS CAN BE DIFFICULT. WHAT DO YOU THINK ARE NECESSARY INGREDIENTS FOR SUCCESSFUL INSERVICE TRAINING?**

First of all, stop using the word training. Just consider, are you training the teachers to train the children? Everyone is horrified at the thought that we're "training" children. So why do we talk about training teachers? I think it's because, in the domain of technology, we think that all teachers have to do is implement something that has been set up by someone else. It's a mechanical process to know how to put the disk in and what to say to the kids—this is what calls for training. But what we *need* is something very different.

We need to encourage teachers to rethink what it is to be a teacher, what it is to learn. With the possibilities for doing mathematics, science, and writing in very different, more integrated ways, some fundamental questions of philosophy open up for teachers. In the past, as long as we were only changing the curriculum very slightly, a teacher could say that mathematics was whatever was in the math curriculum. The opportunity for radical change [makes it] the teacher's business to rethink these fundamental questions.

I think that [it is] most important that principals take teachers much more seriously as thinkers and as activists, as people with a responsibility in society for change and not for implementation of ready-designed systems.

➤**WHAT IS THE BEST WAY TO PREPARE TEACHERS FOR USING LOGO?**

The best preparation for teaching Logo in the classroom is to be very emphatic that we don't want to teach Logo in the classroom. We want to give teachers models—models in which Logo is used as a medium.

For example, I was just working on a project that involved fourth graders working four hours a day for three months. They were using *LogoWriter* to

make a piece of software that would explain something about fractions. Now what were these children learning? Were they learning about fractions, teaching, or how to approach and carry out a very complex project? Because everything happened together, the [components] gave meaning to each other. The children learned more in that time about each of the components than if the entire time had been spent on just one component. As a result, they improved quite spectacularly in their knowledge about fractions and they learned much more Logo than children usually learned.

So it illustrates a principle that sometimes learning more is much easier than learning less. It can be easier than learning each area separately. This is the kind of principle I see carried out by Logo.

➤ WHAT ROLE DID THE TEACHER PLAY DURING THIS *LOGOWRITER* PROJECT?

He or she acted as an advisor, conciliator, consultant, sometimes as a stimulator, and therapist [to ease frustrated spirits]. Sometimes when children tried to do something of great difficulty and didn't get the results they hoped for, the teacher gave them courage. I don't think the project could have happened or been nearly as successful without someone in that room. But what the teacher did not do was tell the students what to do. Instead the teacher only helped them do what they wanted to do.

➤ MANY SCHOOLS CAN ONLY AFFORD TO PUT ONE COMPUTER IN EACH CLASSROOM. WHAT DO YOU SUGGEST IN THIS SITUATION?

Some of the best things I've seen done with computers are by teachers who have one or two computers in the back of the room. This requires a great deal of teacher flexibility. The teacher must be laid back and a lot more "out of it" than when there are 20 computers in a lab with a student sitting at each one.

One or two computers in the classroom can be a bad situation, though. If a teacher or school administrator is too structured and won't let the students step away from the rest of the class to work on their own, it won't work.

➤ THERE IS AN EDUCATIONAL TECHNIQUE KNOWN AS "SUPERLEARNING" THAT WAS DEVELOPED IN BULGARIA AND IS CATCHING THE ATTENTION OF EDUCATIONAL INNOVATORS HERE. THE IDEA IS TO TEACH TO ALL OUR "INTELLIGENCES": LINGUISTIC, LOGICAL/MATHEMATICAL, INTRAPERSONAL, SPATIAL, MUSICAL, BODILY-KINESTHETIC, AND INTERPERSONAL. HOW MIGHT THIS TECHNIQUE COMPARE TO YOUR OWN THINKING ABOUT LEARNING?

I can't comment on this technique specifically [but] I can comment in general that I think it's a profound weakness in our school structure that we fragment knowledge into disciplines and that we fragment children's learning time [accordingly]. I think it is important for education to go less toward fragmentation and more toward whole learning, where people learn through meaningful activities that are not chopped up into fragments.

So I think for learning to be really "super," it will have to break away from fragmentation. I think computers can be used in a way that will greatly facilitate that. I am very skeptical of anyone who came along with a technique of "superlearning" that can be implemented in a standard classroom with a standard curriculum. I think a curriculum and natural learning are really diametrically opposed to one another.

➤ WHAT COMMENTS DO YOU HAVE ABOUT THE NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS' NEW STANDARDS CURRICULUM AND EVALUATION? HOW DOES LOGO FIT IN?

I think they [the standards] are going in the right direction but they are incredibly conservative, from my point of view. But again, I'd make the reservation that if one has to work within the framework of schools as they are and curriculum as it is, maybe there isn't very much room for making radical change.

One of the ways in which the Council is conservative is that it does not make full use of a computer-based construction of learning. I think they would have done much better if they had originally integrated Logo into their proposals. But there is no question that an imaginative Logo-using teacher who wants to follow these standards can do it better with Logo.

➤ SOME RESEARCHERS BELIEVE THAT TEACHING PROGRAMMING TO CHILDREN DOES NOT MAKE THEM BETTER PROBLEM SOLVERS AND THINKERS BECAUSE THE SKILLS LEARNED IN PROGRAMMING ARE NOT CARRIED OVER TO OTHER SUBJECT AREAS. WHAT DO YOU THINK ABOUT THIS?

I'm the first one to agree with this. These silly people [researchers] seem to be the ones who have misread *Mindstorms* as suggesting that teaching programming in itself will do any good to anybody. A large part of *Mindstorms,* in fact, is quite vehemently opposed to some programming.

I don't think that programming in itself is a particularly valuable activity. I do think that learning to program can open up very wonderful opportunities for children to do projects that lead to very good learning . . . to what you call superlearning.

I think one could say the same thing about reading. What's the effect of reading on children? Well, I think if you are reading wonderfully exciting spiritual poetry it will have one effect, and if you're reading violent horror stories it will have a different effect. So I don't think that reading has one particular effect and nor does programming have one particular effect, either good or bad. My criticism is not of [the researchers themselves] but of traditional educational pyschology [which] tends to ask very narrow questions. If you want [to measure] small little effects, you only ask small-minded questions.

➤ WHAT DO YOU THINK ABOUT COOPERATIVE LEARNING?

I think it's very bad when students are forced to work in groups. But, when the collaboration comes around naturally, some of the best things happen. For example, there was one class that I was involved with that had a student that worked hard to be the very best at everything [particularly math]. As it turns out, when the class received computers, he wasn't the best anymore. This led him to get together with another student who wasn't as good in math but was very good in music. By getting together, what rubbed off in the long run was that they both got a much deeper sense of communication. This was a good example of a collaborative experience in which two kids did something that neither of them could do alone. This was different from making six kids work together who have nothing in common.

➤ WHAT ARE THE BENEFITS OF USING *LEGO TC LOGO* AND *LOGOWRITER*?

They don't have any benefit by themselves. I think these are very flexible,

expressive media that imaginative teachers and learners can use for a great variety of wonderful projects. [For example,] I think that a teacher who wants to give children the opportunity to do multi-media long-term projects is able to do this with *LogoWriter* much better than with traditional media like pencil and paper. It's not what Logo can do with children but what we can do with Logo.

➤ TECHNOLOGY IS CONSTANTLY CHANGING AND IMPROVING. WHAT CHANGES DO YOU FORESEE TAKING PLACE WITH COMPUTERS BY THE YEAR 2000?

The most important thing [about] the year 2000 is setting our sights. I think we see from the example that you mentioned—standards from mathematics teaching—that generally educators do not understand that computers play a big role in education. They see it as an add-on that's occasionally available for short periods of time.

In 1980, people thought it was wonderful if there was a computer in school. Today we take computers in schools for granted. If we see there are only six in a school, we think the school is pretty backwards and can't do very much. I think the standard today, though, is that there are enough computers in the schools for children to have access once or twice a week. So that vision for what is the appropriate amount of computers has changed a lot since 1980. I think by 2000 it will change again. I don't think that all children will have free access to computers, but there will be a sufficient number of models in which children will have access to computers everyday for this to become accepted as a standard.

Another big change will be a greater computer culture among a greater number of teachers—as opposed to the present situation, where in very many schools there is one computer teacher and no other teachers really touch the computer or know very much about it. I think the standard model by 2000 will be that the ordinary classroom teacher will be using the computer [and have a greater understanding of it].

➤ I KNOW THAT YOU TRAVEL A GREAT DEAL, VISITING SCHOOLS IN OTHER COUNTRIES. YOU'VE RECENTLY DONE EXTENSIVE WORK IN COSTA RICA. WHAT IS IT THAT YOU LEARN FROM THESE SCHOOLS?

I find that I learn enormously by seeing differences in educational cultures in other countries. For example, in Costa Rica, I saw a project which is implemented in their schools that is unequalled by [schools anywhere else]. They've put about 2,000 computers in schools in the last 18 months. About one percent of American teachers have it so good.

One reason why it is so good is because it is a small country regarded by the world as sort of out of the mainstream — as a developing country. Developing, a funny word: since we [the U.S.] have "developed," we [believe that we've] gotten there, and don't need to do anymore.

I see this Costa Rican project energized by a sense of mission. People feel that they aren't putting computers in schools just to improve test scores, they are trying to develop and express a more energetic and optimistic vision of the future. I think this energizes the teachers to come into it [educational computing] with a much better understanding of it. No one is thinking of teaching Logo commands. The teachers, kids, parents, and the government, are all engaged in taking hold of the future. It's all this energy that I think we saw in the United States in the early days of the computer. I get refreshed by seeing Costa Rica. I'd like to bring to the U.S. educators a sense of this vibrant excitement.

➤ WHAT OTHER PROJECTS ARE YOU CURRENTLY WORKING ON?

I'm trying to write the book that would be for the 1990s what *Mindstorms* was for the 1980s. *Mindstorms* had a certain success because it articulated hopes and perspectives quite widely shared. There was a tremendous sense that this computer was something new and it was going to change learning. The people who were most enthusiastic about the book and got the most out of it were not looking for how-to stuff but for an articulation of a vision. I'm trying to write about that vision—a vision of a less fragmented, more constructive, child-centered education. Part of that vision is that somehow computers will make it easier for children to learn in a more natural, less constrained way, [and that] somehow the computer will be used by teachers and children as an instrument of creativity. ❦

THE LOGO FAMILY TREE

What's Logo all about? Developed by Dr. Seymour Papert and his team in the mid-1960s, it is a computer programming language which lets the user direct the movements of a "turtle" (actually, a graphic triangle on the computer screen). Logo helps children learn mathematical concepts by "moving" objects as opposed to memorizing numbers.

Young children often learn how to use Logo by first moving a three-dimensional off-computer turtle model. Once children understand the "how" of movement, they use the computer to write simple programs telling the onscreen turtle to move, for instance, forward 20 "steps" (FD 20) and turn right at a 45 degree angle (RT 45). The steps that the turtle makes are drawn with lines on the computer screen and can be the building blocks of exciting graphics.

In 1986, Dr. Papert and a team of colleagues developed *LogoWriter*. *LogoWriter* incorporates Logo programming skills with a word processor. Users can move easily between components of the program, mixing graphics and text.

Dr. Papert next combined his programming language with the popular building toy, Lego bricks, to create *LEGO TC logo*. The first shipment of this programmable "toy" was in 1987. Users can build anything from merry-go-rounds to traffic lights and write simple programs to watch their creations move or blink on and off. (The Lego Corporation, incidentally, has endowed Dr. Papert's chair at MIT to allow him to continue developing Logo applications.)

TEACHING

By Janice Sork

COMPUTER CRUSADERS SUPER PAGE SERIES

Each of the six Super Pages in this series features "Super Heroes" especially created to draw students' attention to an essential computer application. The Sept. Super Page explored word processing, Oct. emphasized graphics, Nov./Dec. focused on data bases, and Jan./Feb. explored desktop publishing. March/April will now focus on spreadsheets, and May/June will address "future tools."

Each Super Page is backed with a teacher's guide full of management tips and a set of activity cards through which kids master computer applications skills and complete a series of curriculum-integrated computer tasks.

MANAGEMENT TIPS

SUPER HEROES BULLETIN BOARD

The Computer Crusaders Super Page series can continue as the centerpiece of a year-long bulletin board display.

1. Remove the Jan./Feb. Super Page, headline letters, record keeping charts, and graphics passports. Leave the pocket charts up for new passports and activity cards.
2. Create a cutout letter headline reading "SUPER HEROES EXPLORE SPREADSHEETS TO COMBAT COMPUTERIZED CRIME!
3. Refill pockets with the new Super Hero Passport to the Realm of Spreadsheets (fill in student names first).
4. Purchase or create a grid tagboard for the record keeping chart.
5. Staple up March/April Super Page.
6. Mat open space with colored construction paper for displaying student work.
7. Photocopy, cut apart, and laminate several sets of the activity cards, below. Place these in a pocket on the board.
8. Select spreadsheet program for students to use such as *AppleWorks*, Microsoft *Works*, *Multiplan*, *Magicalc*, *Visicalc*, or *Practicalc*. Set up data disks for students. Store management disks together in pockets on the bulletin board or near the computer.

STUDENT SUPER HERO IDENTITIES

If they have not already done so, have your students make up a super hero name and identity for themselves (including strengths and weaknesses) to use in conjunction with this Super Page series throughout the year. For this Super Page, the student super hero identity will be used for the Super Hero Passport and several activities.

SUPER HERO PASSPORTS

Make a photocopy of the blank passport above for each student. Check your spreadsheet manual for specific details. For example, *AppleWorks* (Claris) columns are labeled with letters, and rows with numbers. Some programs label both rows and columns with letters. Introduce or review your chosen spreadsheet program, and give students time to learn and practice such functions as: column, row, cell, formula, label, data, value. Demonstrate booting, creating and naming a spreadsheet file, moving the cursor between cells, adding labels and values, editing a file, entering formulas, calculating and changing formulas to answer such questions as "What would it cost me if . . ." or "How many weeks would I have to save for . . ." Be sure and review computer symbols for multiplication (*) and division (/) .

SUPER HERO PASSPORT

to the Realm of Spreadsheets

Earth Name: _____

Super Hero Name: _____

- ○ **Input Editor**
- ○ **Spreadsheet Organizer**
- ○ **Problem Solver**

Signed,
Cellular Avenger
and Formulatron

There are three achievement levels for students to work toward. Level I denotes mastery of basic vocabulary and inputing and editing data into a previously setup spreadsheet. Level II is for students who are able to type a preplanned spreadsheet from scratch, adding and editing data. Level III is for students who can plan and implement a spreadsheet with formulas to problem solve. As students demonstrate mastery of these skills, mark or add a sticker to the achievement boxes listed on each passport.

GRID CHART RECORD-KEEPING

The grid chart will help you keep track of student progress on the activity cards. List the activity cards along one axis of the grid, and add your students' names on the perpendicular axis. Paste-on stars, stickers, or a simple felt pen mark can be added as students complete the computer activities.

COOPERATIVE LEARNING ACTIVITIES

Several of the activities below are designed for cooperative learning groups of two to five students. When forming these groups, make sure that each group has a representative mix of abilities, strengths, and weaknesses, and that each group member has a specific role to play (typist, editor, reporter). Explain to students that their individual "success" in these activities depends on the total group effort. Talk to them about cooperating, solving differences, and who makes the final decision if one is needed. Point out that only when a group activity is satisfactorily completed will each member get credit on the grid chart.

GUIDE

Janice Sork teaches fifth grade at Bethany Elementary School in Beaverton, Ore.

ACTIVITY CARD GUIDE

ACTIVITY 1:
SPEEDY SPREADSHEETS

Use this activity to introduce or review spreadsheet basics. Pass out one inch grid paper to students. Draw a grid on an overhead transparency and let them follow along as you explain what a computerized spreadsheet is. Explain that it is made of numbered ROWS (horizontal) and lettered COLUMNS (vertical). Have students label the columns A, B, C, and D, and the rows 1, 2, 3, and 4. The places where the columns and rows meet are called CELLS. A1, D4, F6 are examples of cells. Each cell holds one piece of information—a word (LABEL), a number (VALUE), or a mathematical sentence (FORMULA). Explain that a completed formula gives a value. Let your students label rows, columns, and cells on their grid paper.

Lead a discussion asking students to point to row 1, row 4, column B, column D, and cells B1 and D4. Once students are comfortable with the basics, divide them into groups of two or three to work on Activity 1.

ACTIVITY 2:
EASY EDITING

Put the following information in a spreadsheet file called EASY EDITING:

Cell B1 Super
Cell B6 Formulatron
Cell B7 Avenger
Cell B8 Fontasia
Cell C2 Powers
Cell D1 Datanauts
Cell D2 Caught

Demonstrate to students how to enter data, delete data from a cell or row, increase column width, create a new column, labels, formulas, and print.

ACTIVITY 3:
REMARKABLE RECIPES

Create a spreadsheet file called SPACE CRUNCHIES. Make a file template using the following list with your own ingredients and amounts: Recipe Name, Ingredients, Mixing Instructions, Oven Temperature, Yield. Discuss with students how formulas are written and entered. Use a sample recipe to illustrate how recipes can be doubled and tripled to serve large numbers of people.

ACTIVITY 4:
BEST BUY

A spreadsheet is a useful tool for comparing prices or the ingredients in products. Have available different sizes of jars and boxes of peanut butter and crackers. Have students determine the cost per ounce of each of these products. Next have them sort the columns for the best buy.

Another way that students can determine the best buy is by listing and sorting ingredients Students should list ingredients in their spreadsheet in the same order they are listed in the product. You may want to suggest that they only list the first five ingredients. Using this method, they can determine which products have the most salt or sugar.

Once they've sorted this spreadsheet, have them compare it with the price spreadsheet. Taking both nutritional value and cost into consideration, which is the truly best buy?

ACTIVITY 5:
ACCURATE AVERAGES

Demonstrate spreadsheet averages with a class broad jump. Each student should make three jumps, each time letting a friend record the distance of his or her jump. Next use the data to set up a spreadsheet called JUMP. Let students determine what cells, values (inches or centimeters), and formulas to use.

Once all data is entered, print out a copy for each student. Next, have them develop questions in their groups to be answered by the spreadsheet activity. Repeat this activity allowing students to jump again, edit their previous scores, and discuss how the averages changed.

ACTIVITY 6:
YOU COUNT

When you were born you were counted as part of America's population and every ten years (on the"0" year) the U.S. Constitution requires an update to determine the number of representatives each state sends to Congress.

On the chalkboard, make a list of items that students want counted. For instance, how many kids have fish for pets? Explain to students that what they will be doing is taking a census or a count of people, animals, or things, and entering their data into a spreadsheet which will calculate the total.

ACTIVITY 7:
PROBLEM SOLVING

Review labels, values, and formulas on the activity card. Read the word problem as a class and decide which data is necessary for the spreadsheet. What labels are needed? What formulas could be used? Encourage students to work in groups and brainstorm answers to these questions and devise their own spreadsheet. Make transparencies of students' spreadsheet plans. Each group should have a reporter that explains the spreadsheet solution to the class for discussion.

ACTIVITY 8:
CRUSADERS CONVENTION

Help students plan a Super Hero Convention. Have on hand travel brochures, time tables, and hotel information from different states or other countries that fit your curriculum. Next, students should decide on the place for the convention and what travel information is necessary to include in the spreadsheet. Students will set up a spreadsheet that compares the cost of three different hotels and computes the total cost of hotel, and airfare for each. Students may need to abbreviate names in the spreadsheet. When they find the best location, hotel and airfare, have them design an invitation that lists the information.

COPY & LAMINATE

ACTIVITY CARDS

ACTIVITY 1 SPEEDY SPREADSHEETS

Use your grid chart to fill in the following information.

1. In Cell A1 write the label NAMES.

2. Write your first name in cell A2 and list the names of two or three people in your group in cells A3, A4, and A5.

3. In cell C1 write the label FAMILY.

4. In cell C2 write the number of people in your family. Complete cells C3, C4, C5 with the number of people in your groups' families.

5. In cell E1 write the label PETS.

6. In cell E2 write the number of pets in your family. Complete cells E3, E4, E5 listing the number of pets in your group.

7. In cell B6 and cell D6 write the label TOTAL.

8. In cell C6 write the formula +C2+C3+C4+C5. In cell E6 write +E2+E3+E4+E5. (Note: Some programs may enter formulas differently. Check with your teacher.) These cells will show you totals of family members and pets.

9. Now type in a different number for one of the pets or family members. What happens to cell C6 or E6?

ACTIVITY 2 EASY EDITING

Retrieve a file called EASY EDITING and make the necessary additions and changes as outlined below.

1. In cell B2 type the label Heroes.

2. In cell C1 type the label Super.

3. In cell D2 edit and change the label Destroyed.

4. Increase the width of column E to 20 characters.

5. Give cell E1 a label and type additional data in cells E2, E3, E4, and so on.

6. In cells B3, B4, B5 type the name of other Super Heroes.

7. Determine the powers for all Super Heroes in Column C. Type one power in each cell.

8. Delete Row 8.

9. Add the following values. Cell D3 (45) cell D4 (89) cell D5 (679). Make up values to add to the rest of the cells in column D.

10. At the end of column D write a formula that determines the total number of Datanauts destroyed by Super Heroes

ACTIVITY 3 REMARKABLE RECIPES

It's Cellular Avenger's birthday! She's inviting 200 of her closest friends to a party. Two days before the party she realizes that she forgot to make space crunchies, her favorite dessert. She needs your help! Call up the spreadsheet file called SPACE CRUNCHIES. Type in your own list of ingredients starting in cell B4. Add the amount of space crunchies you want to make beginning in cell C4 and the measurements you will have to use to make a particular amount starting in cell D4. In column E type the formula you would use to double or triple the recipe.

ACTIVITY 4 BEST BUY

Use a spreadsheet program to compare the costs of different brands of peanut butter and crackers. You will need to set up columns and make labels for the brand name, size in ounces, price, and the price per ounce. Also compare the same brand, packaged in different sizes to determine the best buy. After you have found the best buy, compare ingredients of the same product but different brands. Do this by comparing the order of a particular ingredient like, salt or sugar, in each brand. Add this information to your spreadsheet. Which product is the healthiest? Looking at the cost and ingredient spreadsheet, which product is the best buy?

COPY & LAMINATE

ACTIVITY CARDS

ACCURATE AVERAGES ACTIVITY 5

As a class, create a spreadsheet to determine broad jump averages. Use this spreadsheet to answer the following questions:

1. What is located in cell B4? A1?

2. Give examples of a VALUE, LABEL, and FORMULA that was used in the spreadsheet.

3. What were your three scores? What was your individual average?

4. What was the class average for each jump?

5. Who had the highest individual average?

6. Which group averages were the highest: the first and third jumps or the second and third jumps?

7. What have you learned about averages?

PROBLEM SOLVING ACTIVITY 7

Justin, Tracy, and Amy want to buy a computer that costs $400 for their clubhouse. They all earn an allowance of $3 per week for chores they do at home. Each kid has the following savings: Justin ($42.95), Tracy ($29), and Amy ($14.21.) They plan to pool their savings and save all of their future allowances toward the computer. How many weeks will it take to save $400? If they earn an allowance increase to $3.75 how many weeks will it take to save $400.

In a group, complete a spreadsheet using this information. Print out a copy of it and report your solution to the class.

Extra credit: Plan a spreadsheet program with real data showing something you would like to save towards such as a new bicycle, guitar, used car, and so on. Include interest earned by placing the money in a savings account. (Note: Be aware of penalties for early withdrawal).

YOU COUNT ACTIVITY 6

It's 1990 and you've landed a job as a census taker. Your job is to speak to five people and find out how big their families are, how many and what kind of pets they own, and how many use seatbelts. Next, you will enter the information into a spreadsheet, write a formula that will total each category, and finally, report your findings to the class. What interesting facts did you find out? What's the average family size? What's the most popular pet? Make a list of other things you'd like to know. Create a spreadsheet with this new list and then poll your friends.

CRUSADERS CONVENTION ACTIVITY 8

You must decide on a place to hold the annual Crusaders Convention. Take a look at some travel brochures, timetables, and hotel guides. Choose three possible convention places. Enter the information (flight schedule and ticket price, room and board costs) into your spreadsheet. After all the information is entered, write a formula that will total travel expenses for each place.

Extra Credit: Add additional columns showing the cost of food, tips, entertainment, and gifts.

SPEAKING OF LOGO

Interviews with Logo-Using Educators

Linda Lindquist, fourth-grade teacher, Layton Elementary School, Wooster, Ohio.

I began teaching four years ago. During this time I went to a few Logo workshops. I was sold on the creative aspects of doing animation and writing together.

One experience I had with Logo happened when I learned how to interface my computer with a tape recorder. I let three students [using *LogoWriter*] make their own animation that went along with their choice of music. We put the animation and music together and recorded it on a VCR. They essentially made their own music video using *LogoWriter*. Their timing and creativity were spectacular.

I had one student who was running for a class office use *LogoWriter* to make an advertisement for himself. He had helicopters buzzing over the school and a little boy walking. He flashed on the screen all the promises he was making for the kids.

At the end of the year, I make a slide show of students' work. I show it to incoming classes so they can see the different things *LogoWriter* can do.

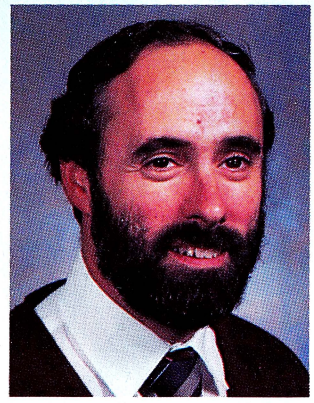
Marion Peiffer, integrated technology classroom teacher, Ardmore Elementary School, Bellevue, Wash.

The exciting thing about Logo is that you can really watch kids think. You can see their thinking processes so clearly—something that you can't see when you use other problem-solving software.

The first Logo programs I used, about eight years ago, were *TI Logo* and *Cyber Logo*. *Cyber Logo* in particular . . . wasn't as easy to use as the newer Logo programs are.

LogoWriter, for example, is very easy for the kids to use. The word processor opens up the whole language arts field so you're not limited to just graphics.

LEGO TC logo is another "microworld" we use extensively. We don't just follow the materials that are provided—instead, we do a lot of exploring. For example, we've done a lot of [testing] with cars on ramps, which gets us into motors. It is interesting to watch the students' development in this area, because when they first started last year as third graders, they knew they had to put the motor on the vehicles but they had no idea what the role of gears was. They would put the motor on and hook it up and expect somehow to transfer that energy to the wheels, which of course didn't work. It was a fascinating process to see them get that idea of the transfer of motion from the motor to the wheels.



Paul Krocheski, computer specialist, Galtier School, St. Paul, Minn.

This is a math and science magnet school for fourth, fifth, and sixth grade. We push to integrate science and math into other curriculum areas. [One example] where we use *LogoWriter* to integrate science, math, and language arts is our constellation unit. Every year our fourth graders study astronomy. We have students research a particular constellation that is apparent here during winter. They have to represent the constellation on the computer, but to do this, they have to understand coordinate graphing. They write a Logo program that plots out their star points on the computer, as if it were the night sky. Then they write a report [explaining their project] with the word processing function. Finally, the students present their report orally, and show their constellation on the large screen projection system.

Our teachers working with *LEGO TC logo* will decide on a major theme project that will tie in with what students are learning in other classes. One year a sixth grade classroom was doing some work on community services and functions. Students were interested in how things were planned and taken to completion. [At the time,] there was a golf course under construction about a mile from the school. The kids walked there with cameras and notepads. They interviewed construction workers, found out about the machinery they were using, and returned to the classroom to design a golf course under construction using *LEGO TC logo*. They built the machines and constructed other props.

[Logo is introduced] in our school district with one full week (30 hours) of teacher training away from the classroom. *LEGO TC logo* teachers receive an additional week's training. St. Paul is unique because it's a district committed to Logo. [Our link to] Logo didn't develop through our technology department, but rather through our staff development department. It was seen as a way to change the way teachers teach and the way kids learn.

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CURRICULUM CONNECTIONS

MATH

Comprehending large numbers

Estimating and measuring

Deciphering symbols for number concepts

LANGUAGE ARTS

Reading about large numbers

Linking language to math

Publishing "big number books"

ART

Creating and combining symbols

Working with scale and proportion

LET'S MILL

The United States is the world's largest debtor nation, according to the U.S. Commerce Department, which pegged the national debt at $532.5 billion at the end of 1988.

• The combined economic damages from Hurricane Hugo and the Bay Area earthquake are estimated to be over $9 billion.

• Pablo Picasso's 1901 self-portrait, *Yo Picasso,* sold in May 1989 to an unidentified buyer for $47.85 million.

Increasingly, average citizens are bombarded with facts and figures of enormous proportions. As our need to deal with ever-more zeros increases, does our understanding of these numbers also increase? Of more importance to us as teachers, are we promoting students' understanding of large numbers and the ability to use them in a variety of contexts with real meaning attached?

This project is designed to give children practical experience in dealing with the concept of a million (and it can be adapted for a thousand or a bil-

MAKE A LION!

By Diana Nunnaley

lion as well!). Because the research indicates a strong connection between language development and an understanding of math concepts, this interdisciplinary project begins with the reading of a piece of children's literature. Students then use two tool software programs to explore and manipulate large numbers, write and illustrate a large number book of their own, and explore the magnitude of large numbers within the context of problem solving.

MATERIALS NEEDED

For this class project, you will need a copy of the book, *How Much Is a Million?,* by David M. Schwartz, with pictures by Steven Kellogg (Lothrop, Lee and Shepard Books, N.Y., 1985). You will also need a word processing program with a copy function and a word count function (such as *Bank Street Writer III* from Scholastic) and a drawing program with a copy function and a tool set for producing circles and boxes (such as *Dazzle Draw* by Broderbund). An optional software resource for Step One is *Semantic Mapper* from Teacher Support Software; for the Extension Acitvities, try *Science ToolKit* from Broderbund. If available, a large monitor or LCD screen would be helpful for class demonstrations (see Classroom Managment, next page). You'll also need

hand calculators for computation; a cup measure; a ruler or yardstick; plus manipulatives such as grass seed, M&M's, dried peas or beans, marshmallows, gummed dots, or balloons.

CLASSROOM MANAGEMENT

This project can easily be implemented in a one-computer classroom—with small groups or pairs of students assigned to scheduled time slots—or in a lab setting, with multiple groups participating simultaneously. (Even where large numbers of computers are available, students will benefit from working cooperatively in groups.) Students should be encouraged to do as much planning as possible prior to using the computer—but be sure to provide ample time for experimentation at the computer, which will become the "laboratory" for the manipulation of large numbers. Whether you work with one computer or more, you'll want to demonstrate software procedures for whole groups of students, so try to gain access to an LCD screen, large monitor, or old TV (connected via RF modulator and video cable).

STEP ONE

What's a Million?

Borrowing a technique from Steven Leinwand, Connecticut's state math coordinator, engage your students in a discussion of large numbers by posing a few intriguing clusters of questions, such as:

• How many potatoes did Idaho grow in 1986? (8.732 billion pounds) What percentage of the Idaho potato crop is purchased by MacDonald's? (15 percent)

• How many videos were rented in 1985? (1.2 billion) How many books were checked out of U.S. libraries in 1985? (1.197 million) Which was more, and by how much?

Next, ask your students to describe a million potatoes, or a million books. How would they explain one million to someone from another planet? Use students' responses to gain a clear idea about their understanding of the concept of one million. On the board, list the words they use to describe a million. Using semantic mapping techniques from reading instruction, help students create a "map" of their responses by organizing their words into categories. (The *Semantic Mapper* program could also be used for this step.)

From this, move to *How Much Is a Million?,* which should be read aloud and passed around for students to look at the illustrations. (If you are doing this project with students too old for picture books, explain that though this book is for a younger audience, the ideas are tough enough for any age.) Following the reading, ask students if a book like this could help someone understand what is meant by a million, and why it might help. Then introduce the idea of students creating a book of their own. Explain that over the next few weeks or so, that is exactly what they are going to do!

The computer becomes a "lab" for manipulating large numbers.

STEP TWO

Write a Million

Divide your class into cooperative learning groups, and explain that their first problem-solving challenge is to find a way to produce one million characters using a word processor. (To give an idea of the magnitude of the problem, *Bank Street Writer III* with default margin settings will produce 3,978 asterisks on one printed page, which is 51 lines of 78 characters each. Students would need to produce roughly 251 and 1/3 pages to display 1,000,000 characters .)

If students are unfamiliar with a word processor, demonstrate the basic steps required and the use of function keys to the whole class using the LCD screen or large monitor. At this time draw students' attention to the fact that the number of characters displayed on the screen may differ from the number which can be printed on paper. Explain that their estimations toward a million will need to be based upon one or the other.

Encourage groups to experiment with different strategies for tackling the million character challenge. For example:

• *Bank Street III*'s word count function will count the total number of characters in a file.

• After printing their first page of characters, students can move away from the computer to work out the logistics of the total solution and only need to return to the computer to print the remaining pages as necessary.

• If printing paper or printing time is at a premium, students should be allowed to photocopy their originals in order to produce one million characters or other graphics.

• The *How Much Is a Million?* book provides a model for showing a portion of a million while still giving readers an idea of the number's magnitude. Students may choose to do the same, by printing 100,000 characters, for example, with multiplication instructions.

• The find/replace function will allow students to substitute symbols if they opt for something different on the screen or printout.

As students work toward solutions, draw to their attention the many different math skills they are using to solve this problem and extend their own number sense. You should also have students discuss the matter of obtaining an exact count. Is it necessary for this particular problem? What would be an acceptable range of tolerance for precision? In what types of problems involving large numbers would being exact become absolutely necessary?

At this point, students may wish to explore other analogies which could be graphically interesting and useful for giving someone a concrete idea of a million.

STEP THREE

Draw a Million

If, in working with the word processor, students have begun to explore other ideas for creating and displaying large quantities, they will be ready to try their hand at using drawing tools to make a million.

With a program such as *Dazzle Draw,* students can use the tools menu to quickly create a simple graphic design which can then easily be replicated many times by using the capture, copy, and paste functions. Once they've mastered the mechanics of the program, the goal of producing a display of one mil-

lion something or others becomes a problem in dealing with the magnitude of the number.

Encourage your students to combine their graphics explorations with creative measuring and quantifying approaches. For example, any of these following ideas could be easily illustrated with drawing tools:

- If a group wants to draw balloons, have members estimate how many balloons it would take to fill the interior of a small car, then how many cars would be necessary to hold one million balloons. The estimates could be illustrated by repeating balloon and card graphics.
- Similarly, another group could use the graphics tools to create a rectangular scale drawing of bricks, then figure how tall a building would be if constructed of one million bricks upon a base rectangle of 100 by 100 feet. How would this compare to the height of the John Hancock Building?
- Sweet-toothed groups may want to draw a circle or oval the size of an M&M or jelly bean, use the real thing to fill a measuring cup, and then figure out how many one-quart jars would be needed to hold one million candies.
- Have nature-loving students check out the schoolyard to determine how many blades of grass can be counted in a one inch square of soil. What size plot would hold approximately one million blades of grass? What would students estimate to be the number of blades of grass in the whole schoolyard?

Again, encourage groups to think up workable strategies for estimating, portioning, displaying, printing, and reproducing their graphic millions.

STEP FOUR

Publish a Million

The next step is to have students cooperate to publish one or more "big number" books showing their word processing and graphics results. If the small groups have explored in enough divergent directions to produce their own individual books, so be it. A cooperatively produced class book is also a very nice conclusion to this project, with different groups taking responsibility for the cover design, table of contents, glossary, charts of figures used in problem solving, and so on. Make copies of the books for every student upon completion of the project. You

BEEP A MILLION!

BY TOM ADAMS

Now that they've typed a million asterisks and drawn a million balloons, give your students a chance to hear a million years.

With this simple *LogoWriter* procedure, your students can program the classroom computer to beep once a second for the next million years...provided that you pay your electric bill on time!

The procedure is really a concatenation of small procedures. The first procedure, MINUTE, simply asks the computer to repeat 60 times a given tone which is one second long. "Tone 500" means the sound frequency of the tone; "20" means 20 twentieths of a second, or one second. So the computer goes "beep-beep-beep..."—60 times.

The second procedure uses the first procedure as a command, by simply telling the computer to run MINUTE 60 times. Presto! You have an hour.

Of course, you could have the computer do something else each second besides beep: draw squares, or march the turtle around, or whatever. Admittedly, hearing the same tone once per second might make one a bit edgy after the first few thousand years.

Students are fascinated by the ease with which the computer can manipulate time, especially very long periods of time. They seem particularly struck by the thought that the procedure which just began running 30 seconds ago will not be finished, in theory at least, until a million years into the future.

LogoWriter Procedures

```
TO MINUTE
  REPEAT 60 [TONE 500 20]
END

TO HOUR
  REPEAT 60 [MINUTE]
END

TO DAY
  REPEAT 24 [HOUR]
END

TO YEAR
  REPEAT 365 [DAY]
END

TO DECADE
  REPEAT 10 [YEAR]
END

TO CENTURY
  REPEAT 10 [DECADE]
END

TO MILLENNIUM
  REPEAT 10 [CENTURY]
END

TO MILLION
  REPEAT 1000 [MILLENNIUM]
END
```

might also have students consider sending copies to *How Much Is a Million?*'s Mr. Schwartz and Mr. Kellogg, with an appropriate class-generated cover letter explaining the project.

At the conclusion of the project, give students an opportunity to articulate just what these activities have meant to them. You might have a "press party" to which suitable dignitaries are invited (including a real representative from the press) to view your class's big number books. Help students compose a press release with sample book pages, and have them help you plan refreshments with suitable references to large number quantities (such as, how many chocolate chip cookies would it take to use one million chips?).

EXTENSION ACTIVITIES

Here are some additional hands-on methods for "making a million."

•Younger students may benefit from collecting items over a long period of time until they reach a goal of one million or a portion thereof. For example, plastic bread tags may be suitable collectibles, especially if you can string them overhead across the classroom.

•Have students make immediate use of what they've learned about millions by reading and reporting on an astronomy book with facts relative to the myriad heavenly bodies.

•Use the light probe from the *Science ToolKit* by Broderbund to construct an experiment in which students take turns waving their hand in front of the probe in order to estimate how much time would be needed for one million waves. Then have them figure the answer to this problem: If a parade route for the President were one hour long, how many waves would the President make, if waving continuously?

•For another *Science ToolKit* experiment, tape the light probe to the school entryway to count visitors to the building for a period of time—say, one day. How many days (or years!) would it take to have one million visitors? Have students compare this to the number of visitors per year to the Empire State Building (2.5 million). ❦

Diana Nunnaley teaches at the Chapter 1 Computer Cooperative Center located at Walsh Middle School, Framingham, Mass.

BY NANCY BLEY

ADAPTING THIS PROJECT FOR SPECIAL NEEDS STUDENTS

Learning disabled students can benefit greatly from educational computing—if it's tailored to their needs. Below you'll find key terms and strategies for adapting this class project for these students.

DEFINITION OF TERMS

Abstract reasoning: Students with difficulties in this area have trouble understanding what they hear or read, particularly if the material includes words with multiple meanings.

Expressive language: Students experience difficulty in this area as inability to "get the words out," even if they understand what response is expected from them.

Memory deficits: Students with memory problems may have understood what they read or heard, but have difficulty remembering more than just a few details.

ADAPTIVE STRATEGIES

Show Me: Students with learning disabilities are often very concrete in their thinking, thus making the understanding of large numbers especially difficult. Before asking questions (see Step One), help students understand the idea. One method is to have students notice the visual patterns of numbers as their values increase. Start with a one digit number, add on a second digit and a third. All the while discuss with students that the value increases with each digit.

Let's Search: Step One of this project should be done in advance. Time should be given for students to gain information that would support their "guesstimates." For example, give students time to call or visit a few libraries to ask if the information is on file. With this information they can find out how many libraries there are and estimate an answer. This will help students with abstract reasoning problems have some basis for evaluating their responses.

Explain It: Students with expressive language problems may need some help verbalizing their ideas. Give them some multiple choice selections as they try to describe a million potatoes or a million books. Help them to compare a million with some known quantity such as a tall building, or a big room.

Look-A-Likes: Programs such as *Print Shop* (Broderbund) or *Dinosaur Days* (Learning Lab) allow shapes to be copied and printed in various sizes. Have students print out 100 small objects, on one piece of paper. Then have them increase the size of the shape. Ask them how this last change changes the amount of paper they need.

Review Please: This project involves many different math skills, some of which students with learning disabilities may have trouble recalling. Prior to starting the unit, review related math skills. You may want to create a notebook with related math questions and answers.

What's the Relationship: Students with receptive language problems or abstract reasoning deficits often have difficulty generalizing and drawing conclusions. Even though some of these students may now understand and be able to solve the math procedures they may still need help associating the procedure with any given part of the project.

I Don't Believe It: Students with expressive language problems or ones who are very concrete in their approach to things may have trouble understanding estimates. These students may need to measure several areas of grass and count its number of blades. (Step Three) Then they may be willing to estimate, but will have to prove themselves right (or close) by counting. Although this may seem tedious it will help develop a sense of what magnitude and quantity mean and when it is necessary to be exact and when it isn't. Another way students can explore this is by holding down a key on the computer; the character will repeat until they release the key. ❦

Nancy Bley is academic coordinator at the Park Century School in Los Angeles, Calif.

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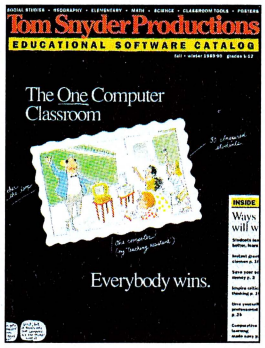

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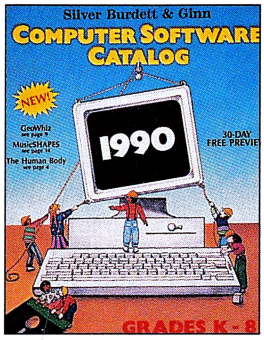

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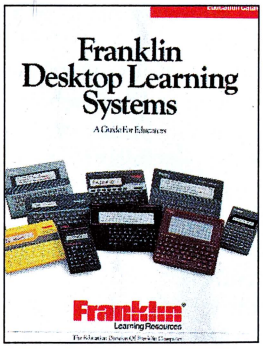

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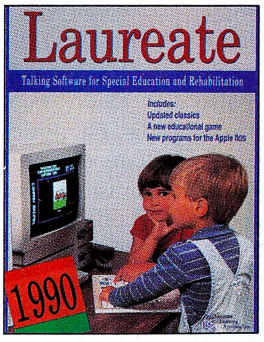

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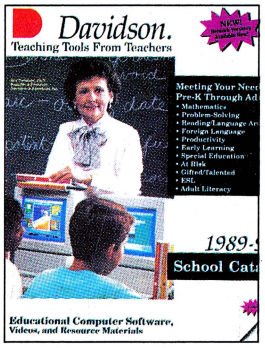

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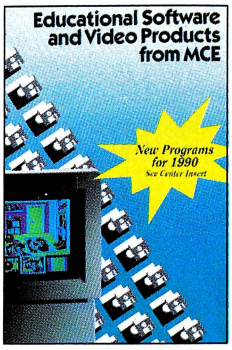

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Curriculum Objective: *Studying different environments to build a terrarium*
Computer Skill: *Using a data base to organize resources*

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Introduce students to a microcosm under glass with this hands-on science activity. Students begin the lesson by researching different regions in the U.S. and then entering their notes into a class data base. Using the data they will create a terrarium with similar characteristics of the region they studied. As a final activity, students will take turns logging the progress of their terrarium.

Materials Needed: You will need a data base program that your students are familiar with, a glass tank or large jars with lids, plants, pebbles, rocks, charcoal, soil, and sand. If possible, small creatures such as frogs, toads, or salamanders, and insects are also useful.

Discussion: Explain to your students that the climate of a region is determined by the weather, temperature, and meteorological changes that take place there. Talk to them about the different climates that exist in the U.S. and how they affect the vegetation and wildlife. For instance, the Southwest is generally dry and often the animals must rely on a plant's flowers and fruits for water. In the Southeast where it tends to be humid, it is different. Animals here can get water from ponds and lakes. Ask students to list other things that may be different depending on the part of the country they're in.

Activity: Divide the class into groups of three or four. Assign each group a region of the country to research. They will be studying the region's climate and the types of plants, animals, and insects that live there. As a class they should decide what information they think is important to the overall project, which is the eventual completion of a group terrarium. To get them started, you may want to suggest categories like temperature, rainfall, ground type, and plant life.

Activity: Ask all groups to discuss what they discovered. Next, as a class, decide which categories are the most appropriate to put in a terrarium data base. For example, your data base might include fields such as:

GROUND TYPE:
PLANTS:
ANIMALS:
INSECTS:

Each group should enter their information under the same headings. Remind them that it is important to be consistent when listing key words for a data base. You may want to help them create a key word list and post it next to the computer. These are suggested key words for each category:

GROUND TYPE: sandy, clay, top soil

PLANTS: succulents, ferns, evergreens

ANIMALS: toads, lizards, frogs, mice

INSECTS: spiders, beetles, flys

Once the key word list is complete, have each group enter their data into the data base. Groups should label their data with the region it comes from.

Activity: Challenge your students to sort the data base for each category. What similarities, if any, do they discover? Do different parts of the country have similar plants? What conclusions can they make about different ground types? Does the ground type affect the types of animals that live in the area? How will these differences affect the type of terrarium they build?

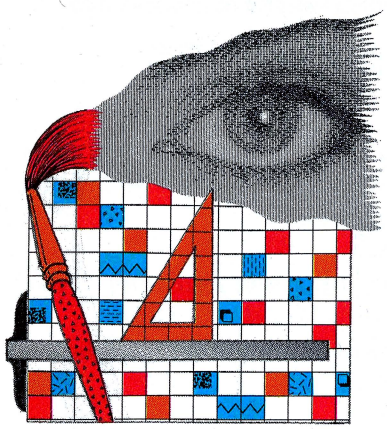
Activity: Once students have discovered which ground, plant, animal, and insect types can live together, let them decide on the kind of terrarium they would like to build. For instance, some students may which to build a "desert" terrarium with sand, cacti, and lizards. Or some may want to build a more common and easy to care for terrarium that will grow plants in a warm, humid climate.

To build a common terrarium, students will need to layer pebbles, charcoal, and top soil in this order, on the bottom of the container. In the top soil, students can plant moss, ferns, and evergreen seedlings. Toads, lizards, beetles, and spiders will live happily in this environment.

When the terrarium is finished, cover its opening and place it in a light area—not in direct sunlight. This way moisture will stay in and the temperature will remain stable.

Activity: Begin a terrarium log in a notebook. Each day have a different student check on the progress of the terrarium and note any changes. Students should not be concerned if they don't notice anything at first, plants take time to settle before they grow. Eventually small surprises without invitations may appear, like tiny insects and seedlings.

Louise Orlando
New York, N.Y.



ART

FINDING YOUR FUNNY BONE

Curriculum Objective: *Learning about and creating cartoons*
Computer Skill: *Using graphics software and a word processor*

Laughter is the prescription to raise low spirits, promote healing, and ease tension. Using this lesson plan, your students will incorporate their computer and art skills with their funny bones to communicate a humorous message through cartooning.

Materials Needed: You may use a graphics program with which your students are familiar—such as *Print Shop* (Broderbund) or *SuperPrint* (Scholastic)—or try software programs specifically for comic strip making, such as *Comic Strip Maker* by Disney Educational Software or *Create With Garfield!* by DLM. You will also need a word processor; plenty of newspaper comics, comic books, and cartoons; multiple photocopies of computer- or hand-drawn doodles; plus blank white paper, pencils, rulers, thin black felt tip markers, correction fluid, erasers, and a sense of humor.

Discussion: Ask your students what this phrase means: "Laughter is the best medicine." Why is laughter compared with medicine? How does a good laugh make your students feel? Next, ask each student to relate a real life event that made them laugh, and explain why.

Now talk about how cartoons have been used throughout the years. Show examples of cartoons depicting certain historical events, characterizing people, explaining a sequence of events, and finally—the type of cartoon that students will be most familiar with—to communicate a funny event or message.

Activity: Pass out comic books, the newspaper funny pages, and—depending on your students' ages—an assortment of political comics. Give students time to review the samples, then ask each student what he or she thinks makes a cartoon funny. Write the responses on the chalkboard.

Next, have students conduct a "What Makes You Laugh" survey. Using a word processor to organize their answers, students should approach friends, teachers, and parents with a few short questions. To get your students rolling, suggest some of these questions:

1) Which comics do you like the best? Why?
2) Which comics spark your imagination (make you think)?
3) How often do you read the comics?
   —— daily —— weekly
   —— monthly —— seldom
4) Which characters are your favorite? Why?
5) Which comics do you dislike? Why?
6) What is your age group?
   ___6-10 ___10-20
   ___20-30 ___30-40
   ___40+

When the surveys are complete, students should graph the results. Using the graphs, they can study which comics appeal to certain audiences and why.

Activity: Tell students that cartoonists use doodling as a way of "thinking out loud on drawing paper." Doodles are quick drawings that are good training for understanding movement and promoting freedom of expression. Because you can doodle anywhere, doodles act as a means for releasing the imagination.

Pass out some pre-drawn doodles and instruct students to use their imaginations to look at the doodles until they "see" a creature. Then have students add humorous creature features to the doodle and design a background for it—great preparation for creating their own comic strips!

Activity: Ask each student or pair of students to choose a comic strip or comic book to look at carefully. Then discuss with your class the following fundamentals of cartooning:

•A comic strip describes a sequence of events using pictures and words. Emphasize the importance of using clear actions and few words to communicate a message.

•A well-drawn character is the basis for a good comic. It is easiest to begin by making quick sketches of lifelike characters. Concentrate on the large forms of the body and their movements, and pay particular attention to the hands and facial expressions.

•In comics, dialogue is written in balloons. It should be kept short and, if possible, there should be only two exchanges per *frame*—one block of a comic strip.

Finally, instruct students to begin developing their own comic strip that depicts a real-life situation or a historical event. (You may want to point out that Jim Davis created Garfield by observing the cats on his parents' farm!) Have them start by creating a cartooning "rough" or sketch of the action, the setting or background, and dialogue to accompany it. As students develop their ideas, let them work on their creations on the computer, adding color to the final printouts. Stress that no one creates a perfect comic the first time around—it takes lots of practice.

When the comics are complete, have a discussion about each one. Do all students think the same things are funny?

Martha Tompkins
Old Donation Center for the Gifted and Talented
Virginia Beach, Va.

Software Companies Mentioned in this Issue:

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San Rafael, Calif.; 800/521-6263

CE SOFTWARE
West Des Moines, Iowa; 515/224-1995

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EPYX
Redwood City, Calif.; 415/368-3200

DISNEY EDUCATIONAL SOFTWARE
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517/646-6458 (in Mich.)

LCSI
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MECC
St. Paul, Minn.; 800/228-3504, 800/782-0032
(in Minn.), 800/263-9677 (in Canada)

POLARWARE INC.
Batavia, Ill.; 800/323-0884

POWER UP
San Mateo, Calif.; 415/ 345-5900

SCHOLASTIC INC.
Jefferson City, Mo.; 800/541-5513

SPRINGBOARD
Minneapolis, Minn.; 800/654-6301

SVE
Chicago, Ill.; 800/829-1900,
312/525-1500 (in Ill.)

THE LEARNING CO.
Fremont, Calif.; 800/852-2255

TIMEWORKS
Deerfiled, Ill.; 708/948-9200

TOM SYNDER PRODUCTIONS
Cambridge, Mass.; 800/342-0236,
617/876-4433 (in Mass.)

OPTIMUM RESOURCES/ WEEKLY READER SOFTWARE
Norfolk, Conn.; 800/327-1473,
203/542-5553 (in Conn.)

SOCIAL STUDIES

WOMEN IN THE NEWS

Curriculum Objective: *Learning about Women's History Month*
Computer Skill: *Using a desktop publishing program*

Three years ago, Congress established March as National Women's History Month. Celebrate women's achievements with a class newspaper, written and designed by your students with a desktop publishing program. The newspaper will act as an invaluable hands-on social studies project that you may share with your entire school.

Materials Needed: Have on hand an easy-to-use desktop publishing program such as *The Children's Writing and Publishing Center* (The Learning Co.), *The Newsroom* or *Springboard Publisher* (Springboard), or *Publish It!* (Timeworks). You'll also need resource materials about women's history, including encyclopedias, books, videos, and pamphlets (see Resources box). For use as models, bring into class several issues of local and regional newspapers.

Discussion: Challenge your students to write down five names of men who have made significant contributions to U.S. history. Have them add an adjective next to each name that tells something about the man in relation to his contribution. For example: "Neil Armstrong—brave." Discuss as a class the names that your students came up with. Make a list of them on the chalkboard. Why were certain men chosen?

Now repeat this process naming significant women in U.S. history. Was it harder to come up with women's names? Why? Were the criteria for men and women the same or different? Were the adjectives similar or different?

Tell your students that, to help fill the information gap about important women in history, they will be responsible for producing a newspaper for Women's History Month. The newspaper should focus on women, past and present, who have made contributions to U.S. history.

Activity: Hand out your newspaper samples, and talk to your students about how a newspaper is organized. Explain that there are different sections that will need to be researched and written. For example, students will need to research information for news articles, sports pieces, editorials, and classified ads, as well as comics and political cartoons. Their newspaper can also cover the gamut of history including the arts, politics, science, mathematics, social sciences, and business. Too often we think of history as just the political vein of life, but all areas of our daily living make up our history.

Activity: As a group, brainstorm a name for the women's history newspaper. Then review the following list of possible newspaper sections to decide which areas might be most interesting:

WOMEN OF NOTE

This list of prominent women may help students get started thinking about subject matter for their newspaper.

Women of the Present: Barbara Bush, Margaret Chase Smith, Julia Child, Gloria Steinem, Sally Ride, Connie Chung, Sandra Day O'Connor, Shirley Chisholm

Women in History: Susan B. Anthony, Abigail Adams, Elizabeth Blackwell, Dolly Madison, Margaret Mead, Grandma Moses, Sacagawea, Harriet Tubman, Martha Washington, Amelia Earhart, Eleanor Roosevelt, Harriet Beecher Stowe

Women in the Arts: Beverly Sills, Louisa May Alcott, Diana Ross, Georgia O'Keeffe, Martha Graham, Barbra Streisand, Grandma Moses, Madeline L'Engle, Katherine Patterson, Maxine Hong Kingston

Women in Sports: Chris Evert Lloyd, Martina Navratilova, Jackie Joyner-Kersee, Florence Griffith Joyner, Joan Benoit, Billy Jean King

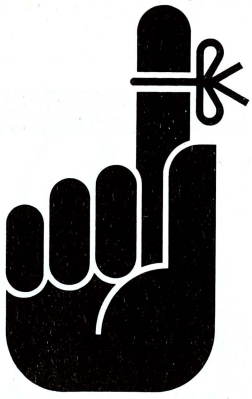
national news, historical news, local news, the arts, sports, opinion and editorial page, classified ads, comics and political cartoons. Once the sections have been determined, decide who will be in charge of the different sections, as well as who wants to work mainly as writers, editors, or artists and designers.

Before they begin researching and writing, remind students that the newspaper's focus is on American women from all walks of life. You can help your students discover information about women from a variety of cultures—such as Native American, Hispanic, African-American, and Asian-American—by using your school and local libraries.

Activity: Have students working on the national and historical news sections develop a list of prominent women and important events that they wish to research and write about. (You might refer the the "Women of Note" box on page 42 to get them started.) Once students have selected and researched their subjects, they should write about them in news style (following your sample newspapers as a model). First drafts can be written by hand or with a word processor, then circulated among classmates for editing. Final drafts can then be prepared for assembling with the desktop publishing program. Remind students to write headlines and select graphics to accompany their stories.

Activity: Students covering sports and the arts can follow the procedures described for the news sections, above,

Activity: Every community has women who are active in local business or politics, run large charitable organizations, do volunteer work, appear on local radio and TV shows, or make significant contributions to the community every day but never get the recognition they deserve. For the paper's local news



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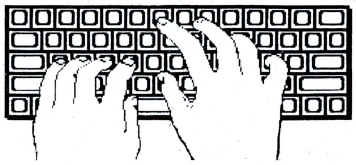

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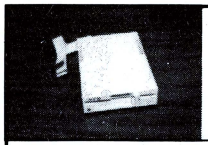

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RESOURCES ON WOMEN'S HISTORY

Two organizations that can be helpful in providing information are the National Women's History Project and the National Women's Hall of Fame. The Women's Hall of Fame (Box 335, Seneca Falls, NY 13148) has some information available and each year sponsors a poster and essay contest for students in grades 4-12. The National Women's History Project (Box 3716, Santa Rosa, CA 95402) can provide a list of resources for curriculum and project ideas.

section, have a team of students make arrangements to interview several of these women to find out what they are doing and how it influences their own lives and the lives of others

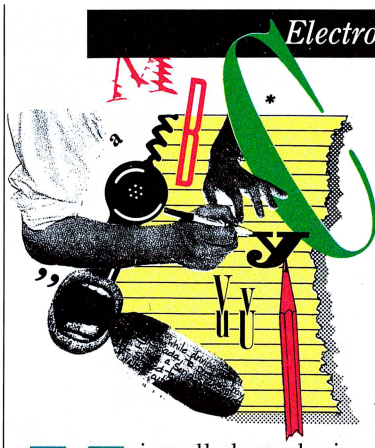
Activity: For the opinion or editorial page, students may write essays expressing any of their opinions about women they've researched or issues of importance to women, such as child care and equal pay. Be sure to leave room for dissenting opinions. You may also want to have students research and develop editorial pieces on the woman they feel has made the most significant contribution to American history.

Activity: No newspaper would be complete without classified ads. For this newspaper, students could have fun developing some ads that tie in with women throughout history. For example: "Wanted: Black female to run underground railroad," or "Lost: Single-engine airplane with female pilot," or "Wanted: First woman to be honored by having her picture on a U.S.-circulated coin."

Activity: Someone in your class with an artistic talent may wish to research and develop a series of comics portraying women in history, or a political cartoon that depicts an important event in women's history.

Activity: When all of the sections have been completed, allow plenty of time for your class to pull the newspaper together on the computer using your desktop publishing program. Encourage them to add catchy graphics and type for the newspaper's name banner. After a final version of the newspaper has been printed out, photocopy it for distribution around the school, to students' families, and throughout the community.

Beth White
Etna Dixmont School
Etna, Maine



LANGUAGE ARTS

EAGLE EYE EDITORS

Curriculum Objective: *Correctiong common writing errors*
Computer Skill: *Editing with a word processor*

Misspelled words, incorrect punctuation, run-on sentences, and wrong words are some of the common problems that many students have when writing. With a word processor and a simple editing lesson like this one, you can help your students correct these problems before they become habits.

This lesson plan lets your students act as magazine editors. They will read a story that contains common student errors which, depending on their level, are marked by in-text indicators.

Materials Needed: To write and use your own files, you will need a word processing program and dictionaries.

Preparation: Review your students' papers and make a list of their common writing errors. Errors may range from spelling to punctuation to sentence structure. Next, write a story that incorporates these errors and allows students to make the corrections (see sample text file).

Write a story about a general interest topic. It is easiest to write the story first without errors, then go back and rewrite the text, putting in the errors you have selected. Place an in-text indicator in capitals to the left of each error (leave these out for advanced classes).

Discussion: Begin this lesson by telling students they will be acting as editors of a new guidebook about animals (or whatever subject area fits your text samples). The text files they will be reading are filled with errors that must be corrected before the guidebook goes to print. Talk about the types of errors they may encounter and explain how they should be corrected. For instance, they should use a dictionary to check spelling.

Activity: Tell your students that, for their first assignment, they must read through the sample text file(s) and make all the necessary corrections, leaving the in-text indicators in place. When they are finished, they should let a classmate review the file for any corrections they may have missed.

Activity: Once students have completed the editing exercises, have them flesh out the guidebook with their own entries. They should first agree on an overall title, table of contents, and audience for the guidebook. Then, give each student an opportunity to write a story and save it to disk. When the stories are complete, have students swap files as they turn from writers to editors. Student editors should read the file on disk and make suggestions and corrections in bold type before passing the file back to its writer.

Tom Adams
Lawrenceville, N.J.

SAMPLE TEXT FILE

Directions: In the draft article on bats, make the correction indicated by each label. Do not delete the labels.

KEY TO LABELS:
SP-> misspelled word
RUN-ON-> run-on sentence
PUNCT-> punctuation

The Winged SP->Mammels

Bats are the only SP->mammels that can fly. WRONG WORD->There bodies are covered with fur. The bones that are WRONG WORD->there hands are covered with a flexible skin that act as WRONG WORD-> there wings. Many bats live in caves or other dark places. They sleep hanging upside down.

Many people SP-> beleive that bats are dangerous but they PUNCT-> arent they are afraid of people like we are afraid of them RUN-ON->they only come out at night. Some Chinese people believe that bats are signs of good luck PUNCT-> happiness, and long life.

BY EILEEN BARNETT AND EVELYN J. WOLDMAN

Calendar Math

"Is it my birthday yet?"

"When is Grandma coming for Easter?"

"Is school going to be over soon?"

"What is September?"

These are the kinds of questions often asked by children at the early childhood and primary level. Answering them can be very difficult because of the abstract nature of time. Both parents and teachers wrestle with helping young children understand the passage of time from one event to another or even from one day to another. Bringing the concept of time down to a level that young children can understand becomes an interesting challenge.

One "yardstick" of time that children can readily relate to is the calendar. They see calendars in their home, in their school, in stores, in children's magazines — they may even get a calendar in the children's section of the Sunday newspaper. Furthermore, young children have an endless fascination with their own lives and routines. Building on what is familiar to them will make learning about time a much easier process for your students.

In the lesson that follows, children will use the classroom computer to create their own calendars featuring their birthdays and other key events.

CLASSROOM MANAGEMENT

The calendar project may work best if it is organized as a learning center activity. Set up the computer and printer, with appropriate software, as one learning center. Because students will be working in small groups with adult help to use the calendar programs, be sure that there is enough room for one adult and several children to gather around the keyboard and monitor at one time. In another learning center—called the calendar counting center—post a variety of calendars for children to look at; you might stock this center with simple worksheets asking students to count days, weeks, and months between events (see Preparation, next page). In a third learning center, arrange a selection of books from the Reading Resources list, below. The fourth learning center can be the arts and crafts corner where students decorate their calendar printouts. While one group of children is at the computer, the other children will be occupied at other learning centers in the room.

SOFTWARE RESOURCES

Any of the following software packages can be used to create and learn about calendars using your classroom computer.

Electric Crayon Series (Polarware). A calendar option comes with each program. Apple II family, MS-DOS, IBM PCjr, Commodore 64.

Print Shop Companion (Broderbund). This enhancment to *The Print Shop* creates monthly and weekly calendars. Apple II family, Atari, Commodore 64, MS-DOS.

Calendar Fun with the Lollipop Dragon (SVE). This calendar-maker also provides information about holidays. Apple II family.

Calendar Creator Plus (Power Up). Calendar program specifically for school use. MS-DOS.

Calendar Crafter (MECC). Creates weekly, monthly, and full year calendars. Apple IIGS.

Calendar Maker (CE Software). Teacher-oriented calendar tool. Macintosh.

The Calendar (Gamco). Teaches calendar skills. Apple II family, TRS80, Commodore 64.

Calendar Skills (Hartley). Drills on calendar facts. Apple II family.

READING RESOURCES

These children's books will add an entertaining language arts dimension to your "birthday month" calendar project.

Happy Birthday, Moon, by Frank Asch, Scholastic, New York, 1990.

Clifford's Birthday Party by Norman Bridwell, Scholastic, New York, 1988.

A Birthday for Frances by Russell Hoban, Harper & Row, New York, 1968.

Chicken Soup with Rice by Maurice Sendak, Scholastic, New York, 1968.

Happy Birthday to You! by Dr. Seuss, Random House, New York, 1959.

Lyle and the Birthday Party by Bernard Waber, Houghton Mifflin, Boston, 1966.

PRIMARY LESSON PLAN

The purpose of this lesson is to give young children the chance to think about and explore the month in which their birthday falls by creating a calendar for that month. They'll then share their calendars with their classmates and gain an overview of all of the months that comprise a year.

Materials Needed: To complete this lesson you will need one or more computers, a calendar-making software program (see Resources on previous page), a selection of other appropriate software (optional), and a printer (with color ribbon or colored paper if available) for the computer learning center. For the calendar counting center, you will need various yearly, monthly, and weekly calendars, plus a supply of counting worksheets (see Preparation, below). For the reading center, have a selection of birthday- and time-related books. Stock the arts and crafts center with crayons and colored markers, stickers (store bought or computer-made), paints, and so on.

Preparation: Use your word processing or graphics/printing program to create counting worksheets with questions like the ones listed here:

How many days are in a week?

How many days are in two weeks?

How many days are in this month?

How many days until the end of this month?

How many days is it from Sunday to Thursday?

How many months is it until the end of the year?

Suzie made a toy out of clay on Tuesday. Her teacher said it would take two days to dry. On what day will Suzie's toy be dry?

On Friday, Mark got a letter from his pen pal. It was sent four days ago. On what day was it sent?

Maria and her family will be moving to a new house at the end of this month. How many days until they move?

In five months it will be a new school year. What month will that be?

Discussion: "Circle time" is a wonderful place to introduce this lesson. Begin by asking children what month and day it is. How many days does this month have, and how many days have gone by? Building on this preliminary discussion, ask who has a birthday during the month. Each child who has a birthday that month can come up and point to his or her birthday on the calendar. Next, have the other children in the circle tell the class during what month their birthday falls. Demonstrate to the children that there are twelve months in a year by showing them on a full-year calendar the order in which the months come. The rhyme "Thirty Days . . ." might be fun for the children to learn.

Next, divide the class into groups by birthday month. You might have students whose birthday is in the current month use the computer first, while the other groups circulate through the off-computer learning centers. (If there are one or more months during which no one celebrates a birthday, those months can be created as a class, making use of a large monitor if available.)

Activity: Explain to the first group of children that they are going to make calendars on the computer for their birthday month. Boot up your calendar-making program, and show how to number the days of that birthday month. Have each child indicate his or her birthday, and help enter appropriate text. Next, ask the children if they know what other holidays or special events happen during their birthday month. When all of the necessary dates have been entered, help students add graphics and fancy typestyles, and print out one copy for the group.

Activity: Each group can take its calendar printout to the arts and crafts center to decorate in any manner that the group members choose.

Activity: Gather together all 12 calendar pages, photocopy one set for each student, and bind them into a class birthday book for students to take home to share with their family. You might also link multiple copies of the calendars together to form a border around the perimeter of the room, or enlarge them on the copy machine to display one per month on the class bulletin board.

Extension Activity: An interesting offshoot to this lesson for those children who are ready would be an activity involving time lines. Using a program like *Timeliner* (Tom Snyder Productions), students could enter all class birthdays along with other special days; the program then displays the dates chronologically in time lines up to 99 pages long. Have students talk about the difference between this method of measuring time and a calendar.

Evelyn J. Woldman is a software specialist for the Chapter I Computer Center in Framingham, Mass. **Eileen Barnett** is a former nursery school teacher currently with the Lesley College Computer Lab in Cambridge, Mass.

BARBARA FRIEDMAN

CREATIVE COMPUTING STUDIO

Task Cards Series for Unlocking Creative Thinking Skills

BY THOMAS E. BOUDROT

Secret (Shhh!) Messages

Kids love to be in the know. When they create secret messages, they know something that others don't . . . and that's where their fun begins!

Secret messages usually involve *codes* and *ciphers.* Though most people use the words interchangeably, they're not the same. In a code, one word stands for another. For example, if "green" means "hello" and "blue" means "friend," then "green blue" means "hello friend." A cipher, on the other hand, changes individual letters rather than whole words. In a transposition cipher, the order of the letters changes ("greetings" might become "rtienegsg"). In a substitution cipher, each letter is replaced by another letter, symbol, or number. If the letter A is represented by the number 1, B by 2, C by 3 and so on, the secret message "8-5-12-12-15" would stand for "hello."

Most ciphers involve a system of one-to-one correspondence. By recognizing patterns in the way words are put together, kids can apply knowledge of language syntax to decode messages. Here are some "keys" that cryptanalysts (people who break codes) use:

CODE KEYS

• First, look for letter frequency. The most frequently used letters, in order, are E, T, O, A, and N.

• Next, look for letter placement. T is the most common letter at the beginning of a word. E is most common at a word's end.

• Then, analyze individual words. "A" and "I" are the only single-letter words in English. The most frequently used two-letter words are "of," "to," and "in." "The" and "and" are the most frequently used three letter words. "That" is the most frequent word with four letters.

• Last, look at the context of words in phrases and sentences. By reading words that are already decoded, common phrases will become evident.

This month's Task Cards encourage children to create some ciphers and creatively decipher others. In the process, students will discover systems, engage in analysis, synthesis, and evaluation to solve problems, and demonstrate persistence to complete routine tasks.

MATERIALS NEEDED

You'll need at least one computer and a printer with plenty of paper; a copy of *SuperPrint* (Scholastic), *Print Magic* (Epyx), *Print Shop* (Broderbund), or any printing program that creates banners; crayons or colored markers; and the four Secret Message Task Cards on pages 49 and 50.

PREPARATION

1. Study your classroom printing software to be sure it creates banners. It should include a variety of graphics and fonts (letter typefaces).

2. Cut out and laminate the Task Cards on pages 49 and 50.

3. Teach your students how to create banners using your classroom printing software. If you're using *Print Shop,* for example, follow these steps:

• Select the "Banner" option from the main menu.

• Select a font (typeface) and a style (either solid black letters or outline letters good for coloring).

• Check the number of characters you're allowed for a banner, then type a coded message.

• Select a graphic and decide if it will be placed before the message, after it, or in both locations.

• Select "Print."

PRE-TASK CARD ACTIVITIES

• Write the following message on the board or overhead projector: "ODOG YDA SBOY DAN SRILG." (It says: "GOOD DAY BOYS AND GIRLS.") Have students attempt to decipher the message. Then ask, "What system does it use?" *(The letters in each word are scrambled.)* Have students write a sentence as a scrambled cipher.

• Pose the riddle, "When is a piece of wood like a king?" Write the answer in cipher on the board or overhead projector. (Using the number cipher mentioned above, the answer is: "23-8-5-14 9-20 9-19 1 18-21-12-5-18," which means, "When it is a ruler"!) What system is used for this code? *(A numeral represents a letter.)* Have students write their name in a number code.

• Copy the "Code Keys," above, on your chalkboard or a ditto, and go over them with your students. Explain that these hints from professional cryptanalysts will help them with all of the Task Cards, especially Task Card 3. (The poem in Task Card 3, by the way, is "Twinkle Twinkle Little Star." The cipher system used turns A into B, B into C, C into D, and so on.)

POST-TASK CARD ACTIVITIES

• *Riotous Riddles!:* Have students check out riddle and joke books from the school library. Tell them each to find one riddle and write the answer using any cipher system they like. Have students type their riddles and answers in a single class document using a word processor. Then print and distribute the riddle sheet to the class.

• *Old Codes:* Kids are fascinated with hieroglyphics—the picture writing of the ancient Egyptians. Check the school library for filmstrips and illustrated books about hieroglyphics. Discuss the difference between a code (like hieroglyphics) and a cipher, and have kids make a hieroglyphic code key. Then assign them to create their own personal or classwide hieroglyphics!

• *Cipher Central:* Make a code and cipher learning center complete with paper, pencils, crayons, scissors, plus invisible ink, code wheels, and other great secret message accessories. Add a few resource books as well. One of my own favorites is *The Code and Cipher Book* by Jane Sarnoff and Reynold Ruffins (Charles Scribner's Sons, New York, 1975).

Thomas E. Boudrot is an independent educational consultant based in New York City.

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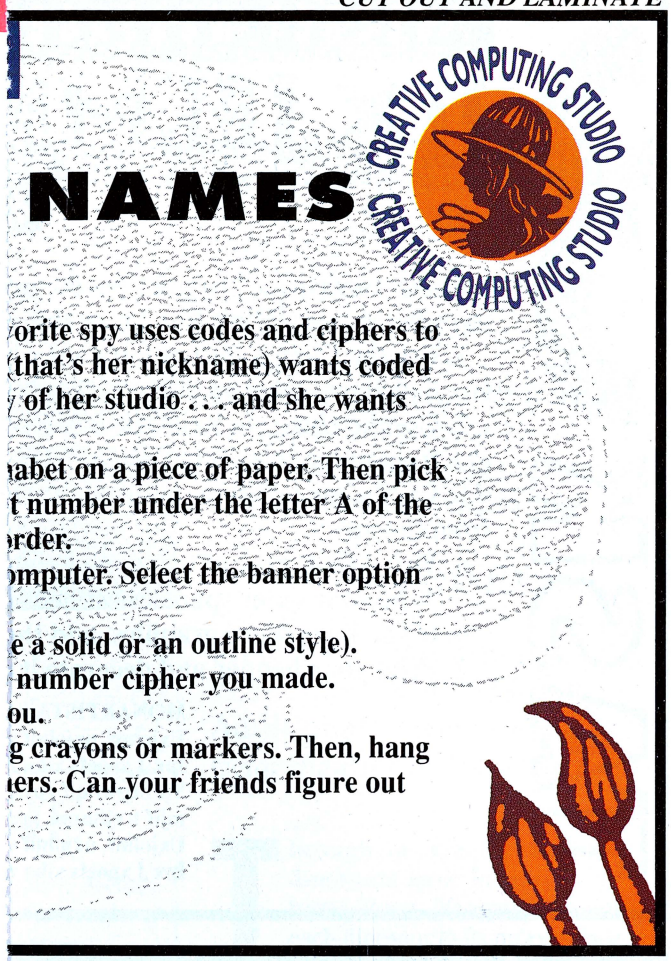

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SECRET MESSAGES

TASK 1

NUMBER NAMES

CREATIVE COMPUTING STUDIO

Monartista is on a spy novel kick. Her favorite spy uses codes and ciphers to keep information top secret. So now Mona (that's her nickname) wants coded messages decorating every nook and cranny of her studio . . . and she wants you to help!

1. Create a number cipher. Write the alphabet on a piece of paper. Then pick a number that's between 1 and 5. Write that number under the letter A of the alphabet. Number the rest of the letters in order.
2. Load your printing program into the computer. Select the banner option from the menu.
3. Pick a font (type of letter) and style (like a solid or an outline style).
4. Type your first and last name using the number cipher you made.
5. Add a graphic that gives a hint about you.
6. Print your banner and decorate it using crayons or markers. Then, hang your banner in a group of other secret banners. Can your friends figure out which one belongs to each person?

SECRET MESSAGES

TASK 2

MYSTERY MENU

CREATIVE COMPUTING STUDIO

Monartista whips up the strangest-sounding meals in her studio. Just yesterday, Mona said she was serving *gegs*—which turned out to be scrambled eggs! "Well," Mona said, "that's just what *gegs* are. Eggs . . . with all the letters scrambled!" Now it's your turn to cook up a scrambled cipher supper.

1. Think of a few food names that would look great scrambled up (like pizza, broccoli, and pork and beans!).
2. Load your printing program into the computer. Select the banner option from the menu.
3. Pick a font (type of letter) and style (like a solid or an outline style).
4. Type the food names using the scrambled code.
5. If you have food graphics, add them to your banner.
6. Print your banner and decorate it using crayons or markers. Then, make a "menu" of food names by hanging your banner with ones made by other students. Now, what's for dinner?

TASK 3

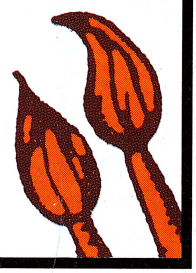
SECRET MESSAGES

UXJOLMF, UXJOLMF

Mona's written a "mystery poem" using a cipher, and it's your job to figure out what it says. (Hint: You know this rhyme—it's "out of this world"!)

1. Use the Code Keys to figure out what the mystery poem is. Make a cipher key that shows what each letter stands for (A=____, B=____, and so on).
2. Use the cipher to write the name of a constellation, planet, or something else from outer space (that's another hint!).
3. Load your printing program into the computer. Select the banner option from the menu.
4. Pick a font (type of letter) and style (like a solid or an outline style).
5. Type your outer space secret message using the code.
6. If you have space graphics, add them to your banner.
7. Print your banner and decorate it using crayons or markers.

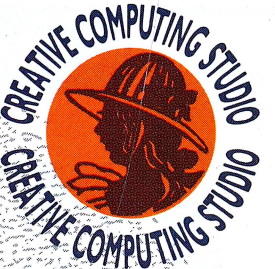
MONARTISTA'S MYSTERY POEM
Uxjolmf, uxjolmf mjuumf tubs,
Ipx J xpoefs xibu zpv bsf.
Vp bcpwf uif xpsme tp ijgi,
mjlf b ejbnpoe jo uif tlz.
Uxjolmf, uxjolmf mjuumf tubs
Ipx J xpoefs xibu zpv bsf.



TASK 4

SECRET MESSAGES

SELF-CIPHERS



Mona can think up some neat ciphers, but she loves to decipher messages, too! Now's the time to find out how good you are at making up your own secret messages.

1. Create a cipher by writing the alphabet on a piece of paper, then writing a new letter or number below each letter of the alphabet.
2. Think of a message to write with your cipher. Keep your message short so that it will fit on a banner.
3. Load your printing program into the computer. Select the banner option from the menu.
4. Pick a font (type of letter) and font style (like a solid or an outline style).
5. Type a message using your cipher.
5. Add a graphic that gives a hint about your message.
6. Print your banner and decorate it using crayons or markers. Then hang your banner. Who's the first person to "crack" your cipher?

SOFTWARE SHOWCASE

Software Recommended for Teachers by Teachers

EDITED BY THERESE MAGEAU

REVIEWED THIS ISSUE

RETURN OF THE DINOSAURS

STORYWORKS

LEARN ABOUT ANIMALS, LEARN ABOUT PLANTS

Added Attractions

By Beth Lazerick

ETHICAL SOFTWARE

The teaching of ethics has long been the job of parents and families. Recently, however, educational institutions have had to shoulder some of the responsibility of teaching children about values and ethics. Software developers have entered this moral arena by offering diverse packages, some of which are briefly described below.

Ethics and You, MCE; 800/421-4157; for the 64K Apple II family.

Ethics and You uses simulations and tutorials to introduce 4–6 grade students to the terminology and concepts associated with ethics, and to prepare students to make moral and ethical decisions.

On the Playground and *Taking Responsibility*, Tom Snyder Productions; 800/342-0236; for the Apple 64K family and 256K MS-DOS.

On the Playground and *Taking Responsibility,* from the *Choices, Choices* series, enable K–5 students to practice setting goals, making choices, and analyzing consequences as they work through various simulations. In *On the Playground*, students must decide what to do when a new and different student tries to play with them on the playground. In *Taking Responsibility,* the class must deal with peer pressure, respect for authority, and lying, as it decides what to do when someone breaks a teacher's vase in the classroom.

Just a Little Lie, Sunburst Communications; 800/628-8897; for the 128K Apple family; Magic Slate II required.

Students in grades 6–8 are challenged to write about what happens when someone tells them a little lie. The activities include prewriting, writing, revision, proofreading, and publishing stories that develop around incidents such as food fights and playground bullies.

Write On! Moral Dilemmas I, Humanities Software; 800/245-6737; for Apple II, MS-DOS, or Macintosh computers with compatible word processor.

Moral Dilemmas I provides junior high students with short stories depicting a variety of dilemmas, including jealousy, unpopular students, and drugs. Students are given prewriting and writing activities in the form of files on a copyable disk. Groups of students are guided through brainstorming ideas, organizing thoughts, creating a position statement, and evaluating their work before beginning the final writing process.

Beth Lazerick is secular studies principal at the Hebrew Day Institute in Rockville, Md.

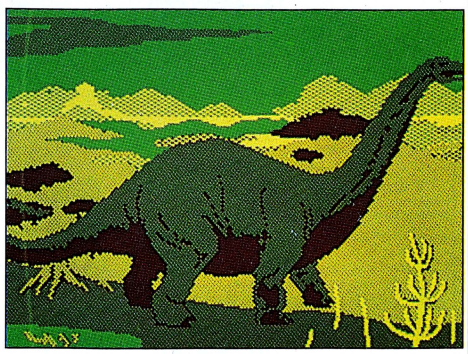
RETURN OF THE DINOSAURS

Grade Level: *4 and up*
Subject Area: *Social studies, science, computer/data base skills*
Computers: *Apple II family, MS-DOS*
Memory Requirements: *128K Apple, 256K MS-DOS*
Additional Hardware: *Color monitor recommended*

Through a crack in time, dinosaurs have invaded your home town. You must return each dinosaur to its proper place and period in the Mesozoic era before time runs out! How do you do it? By becoming an expert data base user, of course!

Return of the Dinosaurs is a new software package that uses an adventure game to teach intuitive thinking, data base access skills, and some interesting facts about dinosaurs. Even if your students aren't at that age when they want to learn everything they can about dinosaurs, they will still enjoy the challenge of playing the game while also learning to use a data base program.

There are four adventures, each taking place at a different hometown "scene": Main Street, Rural Countryside, Museum Park, and Inside the



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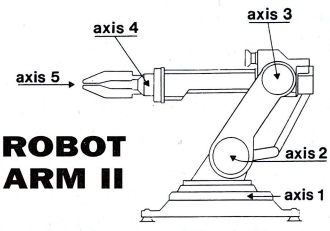

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Museum. Dinosaur trackers must look for hints and clues, then use the information to search the "Dino File" to correctly identify the dinosaur (is it a stegosaurus or one of the 69 other timeless creatures in the data base?), the period to which it belongs (Triassic, Jurassic, or Cretaceous), and the place where it lived (pre-continental drift maps help pinpoint its home).

But there are roadblocks along the way. First there is the time limit: by 10 p.m. Friday each and every dinosaur must be back in its proper place or who knows what havoc they'll wreak upon the town! And since budding paleontologists still need to eat, players must stop for three different meals to maintain their strength. This takes up some of their time, but it also costs money (as do the bus, taxi, and certain clues that can be bought), which players can earn by performing errands for local shops or working on the town newspaper's Dino Column. Thus, the challenge is for students to learn to successfully manage their time and money, correctly intuit hints and clues, and expertly use the data base to save the townspeople from the prehistoric pinch they're in!

Each adventure is increasingly more difficult. The first level of play is actually a tutorial which orients students to using the help screens and instructions in the User's Guide for finding dinosaurs. I found I needed to follow the User's Guide quite carefully to understand how the game operated. The tutorial allows players to explore the different locations in the scene to try out various search strategies. Clues at this level are fairly straightforward, and the evidence and money players amass at this level will be helpful later on when time is running out and the clues become more cryptic.

Players can call up and search the Dino File at any point during play without losing time. In addition to researching clues, students will use the file when they work for the newspaper to correctly answer questions for the Dino Column. Correct answers earn money (but a wrong answer brings a penalty). Players can record their clues in an electronic notebook. When they finally determine all the vital statistics of the dinosaur, players can enter the Time Transporter to place the dinosaur at the correct location and period and actually get to see the dinosaur for the first time.

The game is involving and challenging at the higher levels. It's designed for ages 10 through adult, but from my experience, the game would be a little difficult for a 10-year-old to learn independently. But by carefully following the User's Guide and possibly with some extra assistance, most fifth or sixth graders could at least play at Level I. A school version of the program is currently under development which will include a more comprehensive manual, worksheets for students, and back-up disk for $49.95.

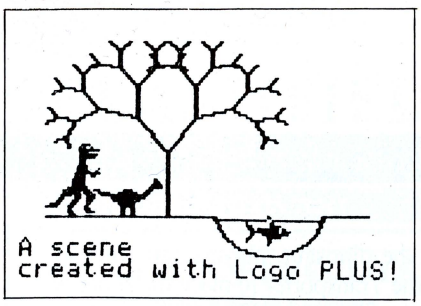
American Educational Computer Inc., 7507 North Broadway Ext., Suite 505, Oklahoma City, OK 73116; 800/222-2811; $39.95; no back-ups; package includes both 5.25 and 3.5-inch disks.

***Beth White**, sixth-grade teacher, Etna Dixmont School, Etna, Maine*
(Circle 120 on Product Info. Card.)

STORYWORKS

Grade Level: *All*
Subject Area: *All*
Computers: *Apple II family*
Memory Requirements: *64K*
Additional Requirements: *Works with any version of* AppleWorks, *except* AppleWorks GS

AppleWorks may well be one of the most popular—and used—programs in schools today, and small publishing businesses have cropped up to support *AppleWorks* users, mostly by providing curricular-based templates. Teachers' Idea and Information Exchange (TI&IE) has taken *AppleWorks* applications one step further and



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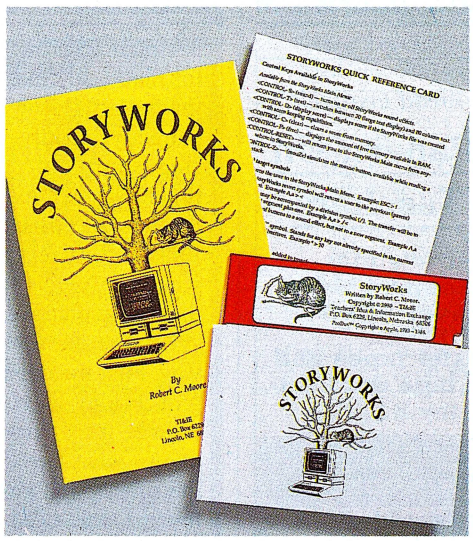

StoryWorks *turns* AppleWorks *files into hypertext files.*

has developed *StoryWorks*, a program that enables *AppleWorks* users to enhance their *AppleWorks* word processing files to perform a variety of hypertext-like functions, from creating multiple ending "twist-a-plot" stories, to linking words in essays to on-disk glossaries, to making multiple choice and true/false tests (and keeping track of students' answers), to adding sound effects to a document.

The basic element of a *StoryWorks* file is a "segment," which is analgous to the *HyperCard* "card." The difference between a *StoryWorks* segment, however, and a *HyperCard* card, is that a segment is not limited to one screen of text: any word processing file of up to 2,700 words created in *AppleWorks* can be one segment. Users create a segment by issuing an *AppleWorks* "set a marker" command which demarcates and assigns a segment number to that file. The actual links among *StoryWorks* segments are "buttons," a term common to most hypertext applications, which consist of a single keystroke (or "click" on the IIGS mouse) that will take the user instantly from one segment to another. Creating the buttons does not require anything more than loading the segment into *StoryWorks* and following the instructions in the easy-to-read *StoryWorks* manual.

The completed *AppleWorks* files, in which all of the segments and their buttons are saved, are called "stacks," another common hypertext term. But there's nothing hyper-tricky about these files: stacks are saved simply as standard *AppleWorks* word processing files. When you want to read or work with a stack, you simply boot up the *StoryWorks* program disk and away you go.

The educational applications are endless. *StoryWorks* makes it possible, for instance, to develop your own adventure stories with several different storylines, similar to popular twist-a-plot stories. Students—or teachers—using the *AppleWorks* word processor can write a story in several different segments, with each segment taking on a different twist in plot. By loading the story into *StoryWorks*, authors can then create buttons that give the reader a choice about which plot line to pursue. Should the explorers go into the cave or enter the wilds of the jungle?

But creative writing is only one classroom application of *StoryWorks*. Social studies students writing a report about the state of Illinois can do so using their *AppleWorks* word processing disk. Then, using *StoryWorks*, they can go in and identify vocabulary, names of important people, or key concepts and create buttons that will take readers to other files—created again in *AppleWorks*—that give more information. A button for the words "natural resources" for example, would immediately bring up a segment the student had written about the Illinois farming industry.

Teachers can create multiple choice or true/false quizzes, complete with positive sound reinforcements (*StoryWorks* contains 26 different sounds). If an incorrect choice is made, students can be led to finding the correct answers. It is even possible to add score keeping capabilties to the quiz.

Teachers' Idea & Information Exchange, P.O. Box 6229, Lincoln, NE 68506; 402/483-6987; $49.95; comes with limited site license to

make up to 35 copies for use in single classroom.

Dorothy J. Cordes, fifth-grade teacher, Girard Elementary School, Girard, Ill.
(Circle 121 on Product Info. Card.)

Learn About Animals
Learn About Plants

Grade Level: *K–3*
Subject Area: *Science*
Computers: *Apple II family*
Memory Requirements: *128K*
Additional Hardware: *Mouse optional but recommended; color monitor recommended*

One of the largest gaps in the educational software field has been in the field of elementary science. As a software specialist, I have long seen the educational courseware industry in a vicious circle. Publishers tend to write for the "safe" audience—those with training, those with immediate need, those with budgets. Elementary school faculty has classically been the lowest on the totem poles in all of these areas, as any K-6 teacher will quickly tell you. And even within the elementary population, language arts and math people have always been the first to be serviced by the software publishing industry; social studies and science have traditionally been among the last. Therefore, these two new programs—designed by Learningways and published by Sunburst specifically for elementary science—enter as a welcome and refreshing edition to an otherwise sparse "installed base." *Learn About Animals* and *Learn About Plants* differ somewhat in content and approach; however, since they are intended to be presented as a series, and since their basic environments are quite similar, I will review them as a unit.

Learn About Animals and *Learn About Plants* make elementary science a discovery experience. Instead of receiving stated facts, young users are placed in an exploratory environment in which they can manipulate the objects on screen in any number of different ways to discover information about the subject. Manipulating can be done using a variety of peripherals, including mouse, keyboard, Muppet Learning Keys, joystick, or Koala Pad. I must admit that the mouse is the easiest to use in these programs.

Learn About Animals is the more primary of the two, with a target population of K-2 students. The menu is divided into eight parts, each activity exploring one aspect of the living environment of animals familiar to young children, such as birds and rabbits.

In "Homes," students catch each animal, put it in its home, label it with its name, and even, if they wish, write a story about it. (One of the nice aspects of the Learningways interface is that text can be written on any screen at any time). "Food" has students match each animal with the food it eats and then label each food. In "Babies," students match mother or father animals with their baby counterparts. Students are then asked to count the number of babies.

Students learn about animal movement in "Move," by matching each animal with the way it travels (such as crawling, flying, or jumping). In "Size," students get practice comparing

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and measuring the size of one animal to another. In "Worlds," students are given two different scenes to which they are allowed to add characters, objects, and text, or to modify the scenes in any way they want. Students may also opt for a totally blank screen and create their own scene. Scenes may be printed out.

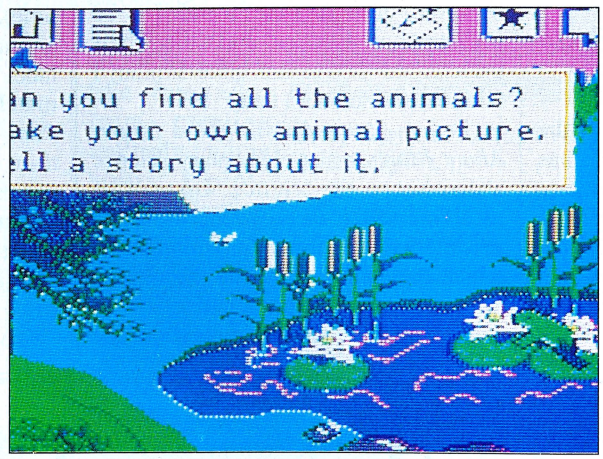
"Create" is my favorite menu option. It replicates the old game of "make your own animal," providing body parts from several different animals. Students can create real or imaginary animals, putting together the heads, bodies, and legs in unlimited ways! These animals also can be printed out. Finally, "Masks" is a nice afterword to the program. Three complete animal masks—of a fox, snake, and rabbit—can be printed out, colored, and worn by students (designated spots for holes for string are even provided). Should a printer not be available, the masks are also reproduced in the teacher's guide.

As you can see, the authors have worked hard to ensure that the teaching of science is not done in isolation. Each of the different activities, while imparting important science information about animals, also teaches valuable skills in other curricular areas, including language arts (story writing), mathematics (measurement and counting), and even art. *Learn About Plants* takes the same interdisciplinary approach.

Learn About Plants is geared for a grade level a shade higher than *Learn About Animals*, specifically for grades 1-3. The activities in *Plants* are a little more in-depth than *Animals* and are more conceptual in nature, whereas *Animals* is more concrete-based. As with *Learn About Animals*, *Learn About Plants* is divided into eight activities.

In "What Is a Plant," students explore basic concepts about plants: that they live, they grow, and they do not move. Students do this by picking up an on-screen plant, planting it in a garden, and watching it grow. "Plant Parts" enables students to identify all the parts of a plant, and label those parts, while "Plant Homes" asks students to place plants in their proper environment. "Seeds" is a fascinating exercise. Students match the type of seed to its tree. They also follow a bean seed sprouting into a plant, and lastly watch dandelion seeds float across a lawn (what wonderful graphics!).

In "Growth," students learn about all the necessary factors for plants to grow—sun, water, food, and air—by observing growth when all factors are present, and by filling in the missing factors to promote growth. "Plants and People" asks students to match food and objects to the plants they were made from. They also match vegetables to the part of the plant from which they come (leaf, root, or seed).



Learn About Aminals *engages young children in exploring and writing activities.*

Although similar to the "Worlds" activity in *Learn About Animals*, "Worlds" in *Plants* is a little more in-depth. In this exploratory environment, students can choose to explore a pond, a forest, a prairie, or a jungle community. They can search for hidden plants and animals, and also, like the former program, add, modify, create-from-scratch, and print out their own scenes, using a large variety of menu options. "Create" is also like the other program, in that students can design and build their own real or imaginary plants, flowers, and trees from a large variety of provided parts. They can label their creations, as well as write about them.

The content of both programs is well-suited to the classic science units on Living Things, studied in every grade 1-3 classroom that I have ever ob-served. The design of the programs also clearly has this age level in mind. It is dynamic, interesting, clear, and easy to follow, and caters to the exploratory nature in all of us. I must admit that I spent a lot of time exploring some scenes on my own after trying it with my own five-year-old (who, by the way, used it with ease!). I think the manipulation of the characters on the screen, which some say is cumbersome for the young child, is simply a matter of familiarity and practice with the mouse, or other peripheral, as it would be for adults as well.

Another aspect of the program that is truly age appropriate is the way it deals with "wrong" answers. If you place an object incorrectly (say, a cactus in a forest), nothing happens on screen. If, however, you correctly place the cactus into the desert, you can watch it bloom. If you place an animal into its proper home, you watch as it scurries in to safety. This type of feedback not only verifies the answer, but takes learning a step further—a unique and powerful strategy!

As we have almost come to expect from Sunburst products (but nonetheless should be grateful for), the teacher's guide is superior. Pre-computer and post-computer lessons are offered in each guide, as well as an extensive bibliography of children's books related to each subject area.

With so few good elementary science products on the market, we computer educators tend to jump on the first we see and hope for the best. Those who want to jump on these two programs won't be sorry. They are well worth the modest investment, and can be used over and over for different purposes.

Sunburst Communications, 101 Castleton St., Pleasantville, NY 10570; 800/628-8897; $65 each; back-ups included; free 30 day preview.

***Evelyn Woldman**, software specialist, Chapter I Computer Center, Walsh Middle School, Framingham, Mass.*
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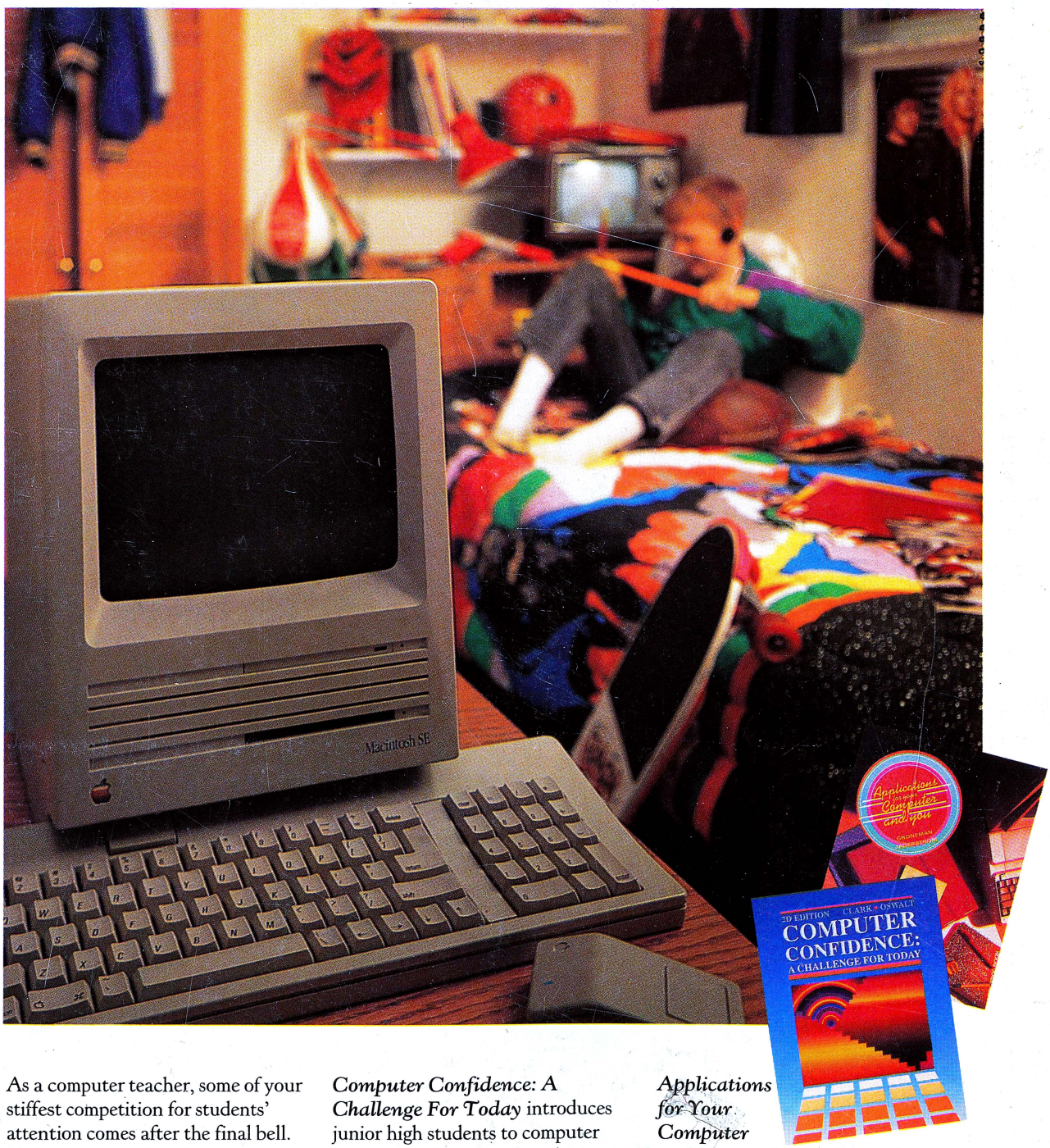

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